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IN THIS ISSUE

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Twenty-Fifth Annual Convention American Association of Nurse Anesthetists

August 18-21, 1958

Chicago, Illinois

Hotel Headquarters — Congress Hotel

PROGRAM

Sunday, August 17
(note double listing)

8:00 A.M.-5:00 P.M.	**—Registration** A.A.N.A. Registration—Foyer, Florentine Room, Congress Hotel
9:00 A.M.-9:00 P.M.	**—Registration** A.H.A. Registration—A.H.A. Headquarters Palmer House
9:00 A.M.	**Assembly of Directors of Schools of Anesthesia*** Florentine Room, Congress Hotel Clarene A. Carmichael, C.R.N.A., B.S., Educational Director, A.A.N.A. *Presiding Officer*
	Greetings Lillian G. Baird, C.R.N.A. President, A.A.N.A.
9:15-10:15 A.M.	**The A.A.N.A. Qualifying Examination** Alyce Graham Roosevelt University Chicago, Illinois
10:30-11:30 A.M.	**Psychological Approach in Teaching** Cameron W. Meredith, Ph.D. Educational Advisor, A.A.N.A Professor of Psychology State University of New York Oswego, New York
11:30-12:00 Noon	**Distribution of New Material**
2:00-5:00 P.M.	**Round Table Discussions**

*Although this program is of specific interest to Directors of Schools of Anesthesia, ALL members are invited to attend these sessions.

Sunday, August 17

10:00 A.M.-5:00 P.M. **Council Session****
Congress Hotel
Florence A. McQuillen, C.R.N.A.
Executive Director, A.A.N.A.
Presiding Officer

Monday, August 18

8:00 A.M.-10:00 A.M. **—Registration**
A.H.A. Registration—International Amphitheatre
A.A.N.A Registration—A.A.N.A. Exhibit Booth No. 402, International Amphitheatre

9:00 A.M. **Assembly of Directors of Schools of Anesthesia***
Meeting Room A, International Amphitheatre
Clarene A. Carmichael, C.R.N.A., B.S.
Presiding Officer

Panel Discussions

2:00 P.M. **General Session**
Meeting Room A, International Amphitheatre
Lillian G. Baird, C.R.N.A.
President, A.A.N.A.
Presiding Officer

Invocation
Ruth L. Hanson, C.R.N.A.
Rapid City, S. Dak.

Address of Welcome from A.H.A.
Edwin L. Crosby, M.D.
Director
American Hospital Association

Address of Welcome
Lillian G. Baird, C.R.N.A.
President, A.A.N.A.

2:15 P.M. Helen M. Reitz, C.R.N.A.
President, Indiana Association of Nurse Anesthetists
Presiding Officer

(continued)

**Although the Council, as provided by the Bylaws of the A.A.N.A., consists of officers and standing committees of national and state associations, the Council Session is open to all members and restricted to members of the A.A.N.A.

*Although this program is of specific interest to Directors of Schools of Anesthesia, ALL members are invited to attend these sessions.

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Reprints available on request 1. Boone, J. D.; Munoz, R., and Dillon, J. B.: Anesthesiology *17*:284, 1956. 2. Zima, O.; von Werder, F., and Hotovy, R.: Anaesthetist *3*:244, 1954. 3. Fitzpatrick, L. J.; Clarie, D'A., and Mersch, M. A.: To be published. 4. Blake, M. W., and Perlman, P. L.: J. Pharmacol. & Exper. Therap. *117*:287, 1956. 5. Ayd, F. J., Jr.: Neraval: A new anesthetic for electro-convulsive therapy, paper presented at Ann. Meet., Electroshock Research Association, Chicago, Ill., April 29, 1956. 6. Irwin, S.; Stagg, R. D.; Dunbar, E., and Govier, W. M.: J. Pharmacol. & Exper. Therap. *116*:317, 1956. 7. Reifferscheid, M., and Dietmann, K.: Deutsche med. Wchnschr. 79:638, 1954. 8. Dietmann, K.: Deutsche med. Wchnschr. 79:1748, 1954.

Monday, August 18

2:15 P.M. **Open Heart Surgery**
Herbert Sloan, M.D.
Associate Professor of Surgery
University Hospitals
Ann Arbor, Mich.

Physiologic Problems of Cardiac Surgery
Robert B. Sweet, M.D.
Professor and Chairman
Department of Anesthesia
University of Michigan
Ann Arbor, Mich.

Role of the Nurse Anesthetist in Cardiac Surgery
N. Pauline McDonough, C.R.N.A.
Clinical Instructor
School of Anesthesia
University Hospitals
Ann Arbor, Mich.

7:00 P.M. **State Night Dinner**
Gold Room, Congress Hotel
Margaret Ann O'Neill, C.R.N.A.
Chairman, Convention Committee
Presiding Officer

Tuesday, August 19

9:00 A.M. **Business Session**
Meeting Room A, International Amphitheatre
Lillian G. Baird, C.R.N.A.
President, A.A.N.A.
Presiding Officer

Call to Order

Appointment of Tellers

Roll Call

Report of Approval of Minutes Committee

Reports of Officers

Reports of Standing Committees

11:00 A.M.-1:00 P.M. **Election of Officers**

2:00 P.M. **Business Session**
Meeting Room A, International Amphitheatre
Lillian G. Baird, C.R.N.A.
President, A.A.N.A.
Presiding Officer

Reports of Standing Committees

Reports of Special Committees

Unfinished Business

New Business

Wednesday, August 20

9:00 A.M.-12:00 Noon **Open House**
Executive Office
Prudential Plaza, Suite 3010
Chicago

2:00 P.M. **General Session**
Meeting Room A, International Amphitheatre
Martha Belew, C.R.N.A.
Chairman, Mid-South Postgraduate Assembly
Memphis, Tenn.
Presiding Officer

Indications and Contraindications for Spinal Anesthesia
John Adriani, M.D.
Director, Department of Anesthesia
Charity Hospital
New Orleans, La.

The Dilemma in Anesthesia. An Analysis of Current and Future Needs
J. Garrott Allen, M.D.
Professor of Surgery
University of Chicago
Chicago, Ill.

7:00 P.M. **Banquet**
Gold Room, Congress Hotel
Lillian G. Baird, C.R.N.A.
President, A.A.N.A.
Presiding Officer

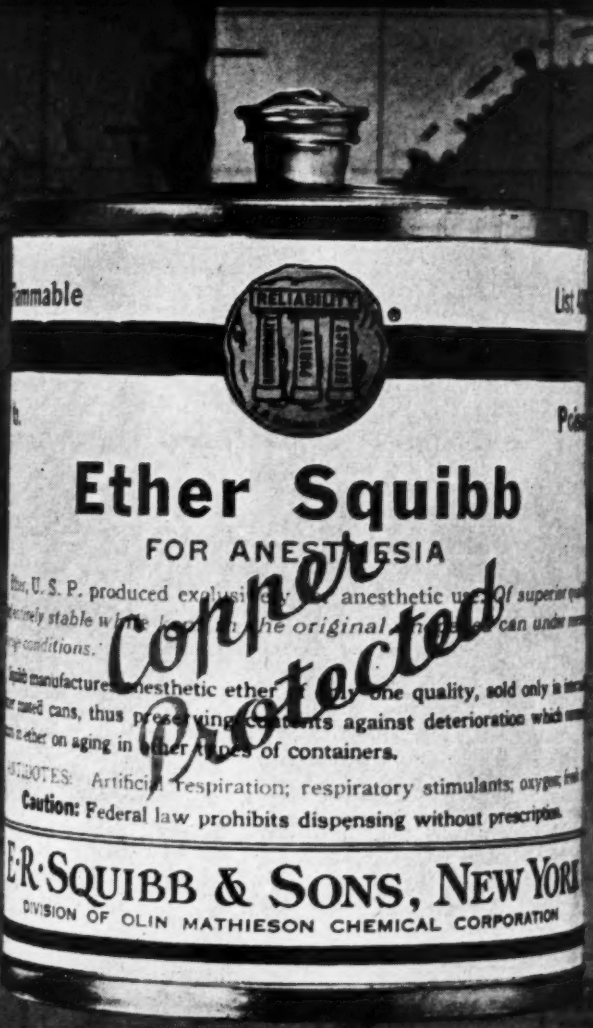
Thursday, August 21

9:00 A.M. **General Session**
Meeting Room A, International Amphitheatre
Helen Heckathorn, C.R.N.A.
President, Ohio Association Nurse Anesthetists
Presiding Officer

The Child as a Surgical Challenge
Ray G. Stark, M.D.
Director of Anesthesia and Inhalation Therapy
Baptist Memorial Hospital
Memphis, Tenn.

Role of the Endocrine Glands in Anesthesia
Julia Arrowood, M.D.
Chief of Anesthesiology
Harlan Memorial Hospital
Harlan, Ky.

Role of the Nurse Anesthetist in the Treatment of Burns
Floya A. Blado, C.R.N.A.
Chief Nurse Anesthetist
Cook County Hospital
Chicago, Ill.



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Thursday, August 21

2:00 P.M. **General Session**
Meeting Room A, International Amphitheatre
Lee F. Hellmuth, C.R.N.A
President, Wisconsin Association of
Nurse Anesthetists
Presiding Officer

Role of the Nurse Anesthetist in Hospital Safety Programs
Jessie L. Compton, C.R.N.A.
Methodist Hospital
Dallas, Texas

One Profession Under God
Janet Geister, R.N.
Chicago, Illinois

Psychology and the Nurse Anesthetist —
A Follow-up of Actual Experiences
Cameron W. Meredith, Ph.D.
Educational Advisor, A.A.N.A
Professor of Psychology
State University of New York
Oswego, N. Y.

4:00 P.M. **Unfinished Business**

4:15 P.M. **Adjournment of General Session**

Call to the Convention

As provided for in the Bylaws of this Association, and at the direction of Miss Lillian G. Baird, President, we hereby issue this official call to the members for the annual meeting to be held in Chicago, August 18-21, 1958. The annual business session will be held on Tuesday, August 19, in the International Amphitheatre.

Accomplished at the Executive Offices, Prudential Plaza, Chicago 1, Illinois, this first day of April, 1958.

Florence A. McAuliffe

Executive Director

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The Use of Artificial Respirators in Anesthesia

Donald W. Benson, M.D.*
Baltimore, Maryland

At the present time, the place of mechanical ventilators in anesthesia practice is not yet clear. The complete clarification will have to wait on laboratory experimentation and clinical usage for accurate and well founded opinion. However, artificial respirators are with us and an understanding of the reasons for using the machines and the principles of their operation is essential for those who use them in their daily work.

The historical evolution of respirators has been reviewed by Mushin and Rendell-Baker in their "Principles of Thoracic Anesthesia."[1]

This ought to be required reading for anyone contemplating the use of mechanical respirators. A perusal of the section concerned with automatic respirators will provoke some interesting ideas. One of the first is that there has been some unique inventive genius displayed by the designers. There is an array of machines truly remarkable for their ingenuity, ranging from complex electronic devices to simple air-driven pistons. A second is that, as there has been an increased understanding of respiratory and related circulatory physiology, there has been a concomitant effort on the part of machine designers to develop apparatus applying these principles. Thirdly, that it is difficult to get a clear picture of why the development of respirators for anesthesia was started. The physiological and bio-chemical data which would attest to the value of respirators was not available in the 1930's when anesthesia respirators had their beginnings. Obviously, it was felt that frequently ventilation was inadequate and there were undoubtedly clinical impressions that there was a need for some other form of respiration than manual, but there were no clear-cut reasons for their use.

It is interesting to pursue this a little farther. Mushin and Rendell-Baker, in an article published in 1954,[2] listed what they considered to be the indications for the use of a respirator.

These were as follows:

"1. It sets free the hands of the anesthetist working alone and

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*Anesthesiologist-in-Charge, The Johns Hopkins Hospital.

enables him to perform other tasks connected with the administration of the anesthetic.
2. It relieves the physical fatigue of the anesthetist's hands and arms during long cases.
3. It relieves the fatigue of the mind (or monotony) of squeezing the bag during such long cases.
4. In circumstances in which the anesthetist is not wholly skilled in manual ventilation, a mechanical respirator provides the surgeon with an operating field which moves to a uniform rhythm, possibly facilitating certain delicate dissections, particularly within the thorax."

Note that, except for the fourth indication, the concern is with the anesthetist and not with the patient. Certainly,the secondary results of the first three indications affect the patient, but the patient is not primary.

It becomes obvious then, that respirators are an adjunct to anesthesia. They are for improving the lot of the anesthetist and secondarily, to make for better anesthesia for the patient. If one assumes the attitude then that respirators are a means to an end, that is, that the criterion of good anesthesia is mechanical respiration, then the indications for mechanical respirators come into better definition.

In the light of accumulating experience and laboratory evidence, it is now possible to restate and add to Rendell-Baker and Mushin's criteria. Such a group of indications ought to include the following:

(1) The use of a mechanical respirator is indicated when it will improve the efficiency of the anesthetist. This includes the factors of physical and mental fatigue which may certainly result in decreased ventilation and when an anesthetist's duties are such that he cannot consistently maintain respiration. This latter is certainly open to question, since it may well lead to total loss of patient contact.

(2) When there is a lack of skill on the part of the anesthetist to provide manual ventilation of a nature both adequate and suitable to an operation, there is an indication for a mechanical respirator.

(3) It has been adequately shown that intermittent positive pressure respiration sometimes has a deleterious effect on circulation and that the use of a positive and negative type respirator obviated this [3, 4]. With the present construction of bags on anesthesia machines, it is impossible to provide negative pressure during manual respiration. Therefore, where manual respiration has proved harmful to the circulation, a respirator may be indicated.

(4) In patients whose normal breathing ability is impaired by disease, such as emphysema and asthma, or by virtue of position, the mechanical respirator with a positive and negative cycle is especially helpful.

Certainly, our indications for respirators do not encompass everyone's ideas on usage. This is impossible. They do, however, in my mind, cover most of the situations where a respirator might be used and give a starting point for the intelligent application of the machines.

It is absolutely essential that the anesthetist understand completely the working principles and the limitations of the machine which he uses. A respirator placed in the hands of someone not so acquainted, is a dangerous weapon. Patients have been

lost because anesthetists have not been completely aware of what a respirator could and could not do. The anesthetist, who has a complete grasp of the methods whereby mechanical ventilators produce their effects, can, within limits, use any respirator.

Most of the surgical respirators commercially available function by applying pressure either directly or indirectly to the breathing mixture within the respiratory system (the patient's lungs and airway, the tubes, airways and canister of the gas machine, and tube and compressor of the ventilator). In this they function just as the hand on the bag does during manual respiration with a gas machine. Ventilators depart from this manual method in that they now, for all intents and purposes, include a negative phase in the respiratory cycle instead of merely coming back passively to ambient pressure.

There are four controllable parameters in ventilators. These are the volume delivered, the peak pressures attained, both positive and negative, the rate of attainment of these peak pressures, and the rate of cycling. To simplify this discussion, let us leave out both rate of attainment and rate of cycling since they are generally mutually dependent and easily set, and for the most part well understood.

Volume and pressure are less readily understood and of greater importance. Ventilators may be divided into two main categories: those which are pressure limited and those which are volume limited. Pressure limited implies that the respirator is set for peak negative and peak positive pressures. On reaching either of these peaks it may either reverse itself, that is cycle, or it may spill the excess gas and hold the peak pressure until the phase is over. It follows then, that volume is variable. A resistive force within the lung or an obstruction within an endotracheal tube will cause a rapid attainment of peak pressure and a more rapid cycling or a larger spilling of gas mixture. In either situation, a decreased volume of gas will be moved into the lungs. By the same reasoning, a decrease in airway resistance will result in a greater movement of air into the lungs.

In the other category, that of volume limited, the apparatus is set to deliver a specific volume of gas. This it does regardless of pressure. If airway resistance increases, the peak pressures attained go up and conversely, if airway resistance drops, the peak pressures are less. It follows then that the machine is pressure variable.

Which of the categories is superior, is a controversial subject. The matter is under investigation in a number of laboratories at the present time and an answer ought to be forthcoming soon. It should be obvious in the meantime, however, that the individual using a pressure limited device ought to be continuously aware of volume changes. The need for volume measurement on pressure limited devices is obvious. On the other hand, anesthetists using the volume limited device must continuously monitor the pressure within the system. In both categories, the accommodation for changes may lie in maintaining a smoother level of anesthesia, supplying more relax-

ation, position change, adjustment of pressures or volume, and the like.

The implication has been made several times that mechanical ventilators need continuous monitoring. There is an inherent danger in that attention wanes when a ventilator begins to work. This only relieves the anesthetist of some of the difficulties mentioned earlier, the continuous observation of the patient is still mandatory and the monitoring of the respirator is added to his duties.

Most machines used in anesthesia have some disadvantages in their functioning. It behooves us to examine these in respect to mechanical ventilators, both from the standpoint of safety and for bringing the use of respirators into a proper focus. By far the major one is the false sense of security which comes over the anesthetist and the surgeon once the respirator is on. This must be constantly guarded against. Continuous observation of both the patient and the respirator is vital. A second disadvantage of mechanical failure, which is not immediately apparent, can occur.

Thirdly, the information obtained unconsciously from the bag by most anesthetists, is not available. The continuous accommodation to resistance changes, which the trained hand does automatically, is lacking. This is valuable information for maintaining a smooth level of anesthesia. The fourth and last is the inherent danger of overdosage by anesthetic agents. The signs of respiration used by anesthetists for control are absent just as they are with manually controlled respiration. However, the continuous, relentless respiration of the mechanical ventilator can literally drive gaseous agents into the patient with dire results. The author has seen cardiac asystole produced in just this manner with ether.

At this point I should like to break away from the usual concept of the use of respirators in anesthesia and briefly discuss an area where respirators ought to be used more often. This is the immediate postoperative period. Patients of marginal breathing ability due to respiratory disease, surgical intervention or drug depression, not infrequently manifest inadequate ventilation for hours or days after operation. In this country, the use of the mechanical ventilation as a postoperative aid to these patients has been negiected. Bjork and Engstrom[3] have recently reported on 76 cases of postoperative ventilatory insufficiency with excellent results.

Postoperatively, mechanical ventilation can be carried out through the endotraceal tube until such time as the patient will no longer tolerate this. If he further requires ventilation, it must be done through a tracheotomy. A little ingenuity using the portions of the one way nonbreathing valves common to most anethsesia departments, can give rise to adaptations of commercial respirators for this purpose. At the present time there are a few available on the market.

In summary, the indications for the use of mechanical ventilators in anesthesia have been reviewed and re-stated. The two main parameters; that of volume and pressure; have been explained and the classifi-

cation of pressure limited and volume limited respirators has been delineated. Finally, disadvantages associated with respirators have been discussed and an added and important use of the respirators during the postoperative period has been indicated.

Bibliography

1. Mushin, William W., and Rendell-Baker, L.: Principles of Thoracic Anesthesia. Oxford, Blackwell. 1953.
2. Mushin, William W., and Rendell-Baker, L.: Modern Automatic Respirators. Brit. J. Anaesth. *26:* 131-147 (March) 1954.
3. Maloney, J. V., Jr., et al: Importance of Regular Pressure Phase in Mechanical Respirators. J.A.M.A. *152:* 212-216 (May 16) 1953.
4. Hubay, Charles A., et al: Circulatory Dynamics of Venous Return During Positive-Negative Pressure Respiration. Anesthesiology *15:* 445-467 (Sept.) 1954.
5. Bjork, V. O., and Engstrom, C. G.: The Treatment of Ventilatory Insufficiency by Tracheostomy and Artificial Ventilation. J. Thoracic Surg. *34:* 228-241 (Aug.) 1957.

The Tranquilizers

Mary A. Costello, C.R.N.A.* Charlotte Turner, C.R.N.A., B.A.
and Gertrude Link, R.N.
Cincinnati, Ohio

Any experienced anesthetist knows that it is impossible to positively predict the action and effects of an anesthetic drug upon a given patient. Also, that why many of these drugs act as they do in producing analgesia and anesthesia, has long been a subject of conjecture and theory. No one really knows. It is our feeling that the group of drugs known as "the tranquilizers" can be added to the above, because one can only theorize as to their true mode of action and cannot predict with certainty how they will affect a given patient. In spite of this unpredictability, it has been estimated that some thirty million prescriptions were written last year for these drugs with the expenditure of more millions of dollars—a staggering figure to contemplate. Scarcely a medical periodical is published that does not contain an article on one or more of the tranquilizers, not to mention the articles appearing in lay publications. It is not our purpose to discuss the tranquilizers as they are prescribed as practically a panacea for all ills, but rather to confine our remarks to discussing a few of the more commonly used drugs, and the effect they seem to have on the patient who is to be anesthetized.

In general, the tranquilizers can be divided into two large groups, according to their mode of action, as shown in the following table:

I. Autonomic Suppressants—Thorazine, Sparine, Compazine, etc.

A. Mode of Action:-
1. Antagonize acetylcholine, histamine and serotinin, which regulate certain autonomic functions.

B. Effects:-
1. Produce drowsiness without necessarily inducing sleep.
2. Interfere with memory
3. Prolong or potentiate barbiturate anesthesia and narcotic action
4. Increase excitability; lower electro-convulsive threshold
5. May produce apathy, depression and loss of initiative in normal persons.

II. Central Relaxants: Equanil, Miltown, Tolserol, Myanesin, Etc.

A. Mode of Action:-
1. Produce relief of abdominal responses to tension and anxiety by a muscle relaxant effect, without affecting autonomic function.

B. Effects:-
1. Potentiate barbiturate or narcotic actions only in large doses
2. Excitability not increased

Presented at the Annual Meeting of the American Association of Nurse Anesthetists, Atlantic City, New Jersey, October 3, 1957.

*Director, School of Anesthesia, Cincinnati General Hospital.

3. Do not interfere with normal responses to environment; no depression or apathy.
4. Marked reduction in muscle spasticity
5. Marked diminution of anxiety and tension.

Table 1

Unlike narcotics, the tranquilizers are thought to affect subcortical areas of the brain. Whereas the opiates and barbiturates, while reducing pain and anxiety, also produce drowsiness, lethargy, and even depression of respiration, which may render the patient unable to respond coherently or to cooperate, the tranquilizers, especially those in the central relaxant group, produce relief of pain and anxiety plus a sense of well-being, without accompanying lethargy, inability to cooperate or respiratory depression. Because of this difference in action, many anesthetists feel that the tranquilizers are a valuable adjunct to pre-operative medication. The effects of pre-operative, long term treatment with the tranquilizers, especially chlorpromazine, were probably first noted in mental institutions. Massive doses of this drug were given to psychotic patients over long periods of time. When one of these patients needed surgery and an anesthetic, the problem of hypotension was great and many patients were lost because of the characteristic irreversibility of tranquilizer-induced hypotension which responded poorly to vasopressors. Now, however, with more knowledge of the effects of these drugs, smaller doses are given, less premedication is required and less anesthetic agent is used to maintain general anesthesia. Spinal block and intravenous barbiturate agents are managed with extreme caution, and are used only when other agents are contraindicated.

Four of the most commonly used types of tranquilizers are Chlorpromazine, Promethazine, Reserpine and Meprobomate. Let us start with Chlorpromazine (Thorazine) and briefly discuss each in regard to its place in anesthesia.

Chloropromazine - Autonomic Suppressant

I. Desirable Effects:-
   A. Enhance effects of premedication and of anesthetic agent.
   B. Antihistaminic.
   C. Anti-emetic.
II. Undesirable Effects:-
   A. Hypotension.
   B. Tachycardia.
   C. Poor response to vasopressors.
III. Choice of Anesthetic:-
   Cyclopropane.

Table 2

From the above chart, it would seem that this drug would be ideal as an adjunct to pre-medication because of its desirable effects. However, with practically all anesthetic agents except cyclopropane, the undesirable effects are likely to predominate in a manner which may prove irreversible. In addition to these phenomena seen in conjunction with anesthesia, serious toxicity may be evidenced in some persons. This toxicity may be manifested by obstructive jaundice, blood dyscrasias and dermatitis, in many cases following even small doses.

Studies made on the use of chlorpromazine intravenously as a premedicant, when cyclopropane was used as the anesthetic agent, revealed the following:

1. No significant change in cardiac output; 2. Reduction in peripheral resistance; and 3. Increase in heart rate and some fall in blood pressure.

In contrast with severe hypotension and tachycardia seen when chlorpromazine is used with other agents, the above effects are relatively innocuous.

Promethazine (Phenergan), on the other hand, may be a very useful drug in the hands of the anesthetist. The following table briefly outlines its effects:-

Promethazine (Phenergan) - Central Relaxant

I. Desirable Effects:-
- A. Enhances effect of premedication and of anesthetic agents.
- B. Antihistaminic.
- C. Combats emesis and hiccups.
- D. Minimal depression of vital functions.
- E. Can be used in children and geriatric patients with few side effects.

II. Undesirable Effects - (usually as a result of large dosage):-
- A. Hypotension.
- B. Tachycardia
- C. Respiratory depression.

III. Choice of Anesthetic:-
Any agent except intravenous barbiturates.

Table 3

With this drug, the desirable effects outweigh the undesirable effects since the latter become apparent only as a result of large dosage. This drug has been found valuable as premedication in conjunction with meperidine. It has been found to relieve fear and apprehension and promote a feeling of well-being and relaxation in patients coming to surgery. As a result, as with any satisfactory pre-medication, reflex irritability is reduced and less anesthetic agent is needed. Care, however, must be taken in the use of promethazine with intravenous barbiturates since it markedly enhances their action. Complications of hypotension, tachycardia and respiratory depression may intervene with this combination; however, response to treatment of these untoward effects is much more predictable with promethazine than with other tranquilizers. It is also claimed to be of value in postoperative sedation, lessening pain and apprehension and stabilizing of vital signs. When given in conjunction with narcotics however, the narcotics should be administered in smaller dosage.

This drug is of particular value in combination with spinal and local anesthesia. Most adult patients given 25 milligrams, will become calm and drowsy, although easily aroused. Vital functions are affected minimally, if at all. With promethazine as an adjunct, many surgical procedures which might otherwise require addition of intravenous barbiturates in anesthetic dosages, can be made possible under local anesthesia.

It is worthy of note that chlorpromazine, promethazine and meperidine can be successfully combined in what is known as a "lytic cocktail". The dosage of each drug is as follows: Chlorpromazine - 25 mgm., Promethazine - 25 mgm., and Meperidine - 100 mgm.

This combination yields 4 c.c. of solution which may be administered intramuscularly ninety minutes preoperatively to the adult who is to have procedures such as carotid angiogram, femoral arteriogram, cardiac catheterization or even closed reduction of some minor fractures. It has been used with phenomenal success at the Cardiac Clinic, Children's Hospital, Cincinnati, Ohio for cardiac catheterization of children of all ages with congenital heart disease. In children, the dose is estimated giving 1 c.c. of the "cocktail" for each twen-

ty pounds of body weight. With the lytic cocktail the children are drowsy but cooperative and come through the procedure with few complications and minimal discomfort.

In the adult, it has been occasionally necessary to repeat meperidine 50 mgm. and promethazine 25 mgm., half intramuscularly and half intravenously, to maintain good analgesia and cooperation of the patient during the procedures. However, with this supplement, the pain and discomfort of intravenous or intra-arterial dye injection is reduced to the extent that satisfactory X-ray films can be obtained for diagnostic studies.

In our opinion, Reserpine is one of the most dangerous of the tranquilizers in combination with anesthesia. In the table below its effects are outlined:

Reserpine - Autonomic Suppressant
- I. Desirable Effects:-
  - A. Reduction in nervous tension plus sedative effect.
  - B. No significant change in arterial O_2 tension.
  - C. Pulmonary ventilation not affected.
  - D. Increases appetite.
- II. Undesirable Effects:-
  - A. Hypotension during and after anesthesia.
  - B. Bradycardia — cholinergic effect.
  - C. Peripheral edema.
  - D. Prolonged effect even after withdrawal.
  - E. Poor response to vasopressors.
- III. Choice of anesthesia:-(if any) Cyclopropane.

Table 4

Reserpine is a Rauwolfia derivative, used extensively for reduction of blood pressure in the hypertensive individual. It is also used as a tranquilizer, per se, because of its similarity in action to that of chlorpromazine. Its undesirable effects may become apparent, when anesthesia is superimposed, for as long as two weeks after withdrawal of the drug. If the anesthetist is not informed of the fact that a patient has been receiving Reserpine, irreversible hypotension may take place following induction of anesthesia with any agent. This may hold true even under the lightest plane of anesthesia with nitrous oxide and oxygen. It is our conviction that at least three weeks should be allowed to intervene between withdrawal from Reserpine therapy and the administration of an anesthetic. Overdosage with Reserpine has been known to result also in serious psychological complications such as suicidal tendencies and marked depression.

The fourth and last type of tranquilizer which we will mention here is Meprobamate. This is one of the least noxious when used in average dosage, as shown in the outline below:

Meprobamate - Equanil, Miltown - Central Relaxant
- I. Desirable Effects:-
  - A. Low toxicity; four to five times less toxic than most barbiturates.
  - B. Skeletal muscle relaxant, with little, if any, action on diaphragm.
  - C. Anticonvulsant.
  - D. Can be used as pre-operative sedation without producing hypotension or respiratory depression.
  - E. Minimal, if any, action on vital functions.
- II. Undesirable Effects: - (Probably due to idiosyncrasy)
  - A. Allergic dermatitis with pruritus, fever, chills.
  - B. Diarrhea.
- III. Choice of Anesthetic:-
  - Any agent.

Table 5

Meprobamate is used orally and cannot be given parenterally; therefore, it has a greater margin of safety

and fewer side effects. There is relatively little danger of untoward responses in patients coming to surgery who have been medicated with Meprobamate and no special anesthetic agent is contraindicated. This drug is actually the most widely used of all the tranquilizers, being prescribed for any number of psychosomatic disorders with good results.

Conclusion

1. It is extremely important that the anesthetist be made aware that a patient has been treated with tranquilizers. 2. The anesthetist should know in what way the drug may affect the action of the anesthetic agent; therefore it is imperative the physiological effects of these drugs be known. 3. Vasomotor depression seen following the administration of some of the tranquilizers may be extremely difficult to treat, responding only to the use of the most potent vasopressor drugs. 4. Extreme caution should be observed with any change of the patient's position, especially when the patient must be in Fowler's or head-up position, because of the frequent occurrence of postural hypotension. 5. Any anesthetic agent which has a ganglionic blocking effect, such as deep ether or high spinal, should be avoided. It is still our contention that there is no drug, or combination of drugs, which can ever afford the wide margin of safety provided by a skillfully administered inhalation anesthetic.

Bibliography

1. Berger, F. M.: Chemistry and Mode of Action of Tranquilizing Drugs. Ann. New York Acad. Sc. 67: 685-700 (May 9) 1957.
2. Rodman, Morton J.: Drugs for the "Age of Anxiety". RN 20: 48, 1957.
3. Sadove, Max S.: Promethazine in Surgery; Preliminary Report. J.A.M.A. 162: 712-715 (Oct. 20) 1956.
4. Etsten, B., and Li, T. H.: Circulatory Effects of Chlorpromazine Before and During Cycloprapane Anesthesia in Man. Anesthesiology 18: 203-215 (March-April) 1957.

The Preanesthetic Evaluation of the Patient with Cardiovascular Disease

Charles S. Coakley, M.D.*
Washington, D. C.

An exchange of ideas is always healthy. There are many problems involved in the management of patients with cardiovascular disease.

All efforts should be made to evaluate the functional reserve of the patient and then the anesthesia planned to maintain as normal a physiologic status as possible. Almost all of the poor risk patients are those who have some limitation in the various components of the complex oxygenation mechanism. Most of these reductions are seen in the cardiovascular or respiratory systems. With a well trained team made up of the internist, surgeon and anesthetist, it is rare to deny necessary surgery to any patient.

Cardiovascular Diseases

The patients with cardiovascular diseases that present problems to the anesthesiologist are those with reductions in *blood volume; cardiac* conditions such as coronary artery disease, myocardial failure, the arrhythmias involving the ventricles and *vascular conditions* such as hypertension and aneurysms.

Blood Volume

The problem of reductions in blood volume is one of diagnosis. Blood volume replacement is generally carried out on the basis of hemoglobin, hematocrit and clinical evaluation. This may be greatly in error and some more reliable method of determination should be available. We are setting up a blood volume laboratory using red blood cells tagged with Chromium^{51}. This appears to be a relatively inexpensive, simple, yet accurate method of determining total blood volume. Once reductions are measured, replacement can be more intelligently carried out. The use of the 'casual' blood transfusion should be discontinued because of the risk involved whenever blood is given. The casual blood transfusion may be defined as that transfusion which is given to patients with normal blood volume, whose blood loss is less than 500cc.

Cardiac Disease

There should be very little increase in the operative risk of any patient with cardiac disease. The problem

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*Professor and Director, Department of Anesthesiology, George Washington University School of Medicine.

here is the preoperative evaluation of cardiac reserve. Generally speaking, a patient with cardiac disease who carries out his daily routine without disability should be a good risk. A more complete cardiac evaluation is indicated when there is a history of precordial pain or coronary occlusion, dyspnea, disturbances in rhythm and dependent edema.

The surgical mortality for the patients with coronary disease has decreased impressively in the past 25 years. The figures available indicate a mortality rate of between 3 and 7%. In our own experience, the mortality should be no higher than for those patients without heart disease. Two of the patients in our series were found at post-mortem examination to have had infarctions within two weeks prior to surgery, which had not been diagnosed. We recommend a preoperative EKG for all patients over 50 years of age undergoing major surgery. We prefer to defer surgery for 4 to 6 months following an infarct but during the past year, emergency surgery had to be performed on two patients hospitalized with coronary occlusions. Both of these patients had no cardiovascular difficulties during or following major procedures. We all will agree that once the diagnosis is made and surgery becomes necessary, all effort will be made to prevent hypoxia or hypotension. In recent years, we have changed our management of these cases. We previously used general anesthesia with ether as the primary drug. Now we prefer Pentothal®-gas - muscle relaxant technic with scrupulous attention to adequate ventilation and the heart monitored on an operating room electrocardioscope.

The patient in cardiac failure is the worst possible cardiac risk. There is rarely any indication to anesthetize a patient in congestive heart failure. With the proper use of the intravenous digitalis preparation, cardiac failure can be corrected within a few hours. Then surgery can be performed with greater safety. Regional anesthesia is the choice, in most cases, in this group of surgical patients.

The problem in the management of cardiac arrhythmias is the control of ventricular rate. The two conditions that concern us in anesthesia are multiple premature ventricular contractions and heart block. Either condition may result in cardiac arrest. There is nothing that can help heart block but multiple p.v.c'.s. can be treated preoperatively with quinidine or procaine amide.

The valvular lesions of greatest concern to the anesthesiologist are those involving the mitral and aortic valves and the congenital defects. As the result of experience achieved in the management of mitral commissurotomies, I believe we will agree that light anesthesia is essential no matter what drugs you may use, plus careful attention to oxygenation, blood pressure and control of heart rate.

Vascular Disease

The most common problem involving the vascular system is that of hypertension. An elevation of blood pressure without cardiovascular changes does not increase the anesthetic risk. Complications resulting from arteriosclerotic changes affecting the myocardium, brain or kidneys

may increase the risk. Thus, in the management of the anesthetic for the patient with high blood pressure, associated arteriosclerotic changes must be considered. We feel that spinal anesthesia is usually not the anesthetic of choice.

In the past few years, a new problem has been created by the use of the tranquilizing drugs for their antihypertensive effect. This problem has been limited to the Rauwolfia alkaloids. We have seen no cardiovascular difficulties with meprobamate or the nonbarbiturate hypnotics. In our study, 40% of the patients on Rauwolfia therapy had significant circulatory changes during anesthesia. Blood pressure depression greater than 40 mm/Hg and pulse rates falling either below 60/min. or 20/min. below preoperative rates occurring prior to surgery were considered significant.

The mechanism of this effect appears to be a suppression of the sympathetic response by the Rauwolfia alkaloid and enhancement of the vagal response by drugs such as Pentothal® and cyclopropane or spinal anesthesia. The end result is a vagal response. These patients respond to a vagal blocking drug but not to the vasopressors. It is recommended that Rauwolfia therapy be discontinued two weeks prior to elective surgery. If this is not possible, as in emergency surgery, a vagal blocking drug should be used to prevent and treat these circulatory responses and Pentothal,® cyclopropane or spinal anesthesia should not be the anesthetic of choice.

One of our more recent problems is that of the management of patients for resection of arterial aneurysms. An important consideration is the fact that this is a generalized vascular condition and not merely a localized process. It has been reported that 66% of these patients have associated cardiovascular changes. The choice of anesthesia will depend on the location of the aneurysm, whether ruptured or unruptured and the cardiac status.

Aneurysms above the diaphragm are best managed under general anesthesia; those below the diaphragm, with either general or spinal anesthesia. Patients with unruptured aneurysms below the diaphragm, who have reduced myocardial or respiratory reserve, may be more safely done with spinal anesthesia.

The protection of the spinal cord against ischemic changes as the result of cross-clamping the aorta is an important consideration. It has been generally considered to be reasonably safe to cross-clamp the aorta below the T_8-T_9 level without causing cord damage. We have had two patients with cord damage following cross-clamping the aorta below the renal vessels during the excision of an aneurysm and insertion of a graft. We had one following the occlusion of the thoracic aorta during the repair of a coarctation. In cases in which hypothermia has been used, there has been no evidence of cord damage. It appears that hypothermia may afford some protection against cord damage. One patient had his thoracic aorta cross-clamped to correct a coarctation for 50 minutes without any sequelae. There is some question as to the protection of liver, kidney and heart. Hypothermia appears to protect all except the heart.

Heart failure has been reported but we have not had this complication. We have used vasodilators such as Arfonad ® or removed blood until pressure was within normal range. This appears to reduce the workload on the heart.

Some of the problems of the anesthetic management of patients with reductions in cardiovascular reserve have been discussed. The solution to these problems is not complete. Emphasis on better pre-operative evaluation is essential. Once the reductions in physiological reserve are appreciated, the safest anesthesia can be selected that will accomplish the surgical procedure.

Essential Qualifications for an Anesthetist

Sister M. Yvonne, B.S., C.R.N.A.*
La Crosse, Wisconsin

Across time's span, pain and discomfort have been the greatest threats to man's physical well-being. And man, confronted constantly by them, has sought alleviation in a search as old as pain itself. Modern man with his many methods of relieving pain developed over these many centuries of seeking, may find it difficult to appreciate the suffering of surgical patients in the days before anesthesia.

The anesthetist, then, by profession, is enlisted in this continuous battle against pain. In the past twenty-five years her field has progressed greatly, paralleling the advancements made by modern surgery. As a highly technical field of special skill, anesthesia still retains a bond with the other nursing and medical branches.

The lure of anesthesia and its fascination to those in this field lie often in the variety of the work. The problems with which it challenges one's ability are almost endless; they arise not only from the actual equipment and techniques but also from the physical status of the patient, as well as the special demands of individual surgeons. The wide variation of reactions to the various anesthetic agents provide a constant challenge and alertness on the part of the anesthetist. She must learn to combine skill with experience, for both are essential to success.

The specific qualifications of a good anesthetist are many. Basic, of course, is a general, all-around competence. No one can have confidence in an obviously blundering type of person. Another is alertness. The anesthetist should be wide awake, quick-thinking, and always on her toes. Furthermore, she must be conscientious and careful in her work, administering her thousandth anesthetic just as well as her first, and at all times concentrating on the case at hand.

A good anesthetist must be up to date in her field. Thus, she will maintain contact with the latest books and periodicals, and through hospital visits, conventions, and institutes keep an open mind to the ideas of others in her field. She should not, however, limit herself to knowledge of anesthesia only, but try to possess a maximum knowledge of such allied subjects as general medicine, surgery,

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* Director, School of Anesthesia, St. Francis Hospital.

pathology, pharmacology, psychology, anatomy, physiology, and other branches of therapeutics. Being well read in other areas such as the liberal arts, will greatly aid her in sustaining a diverting conversation with her patient thus transferring his thoughts from fear of the coming ordeal to some topic of interest to him. Such reading will also be of value to the anesthetist personally, enriching her enjoyment of life.

The anesthetist must be a keen observer to monitor the effects of the anesthetic on the patient. She must use good judgment in working with each case. She must at all times, and under all provocations remain calm, so as to inspire the confidence of both the surgeon and the patient. She must be sympathetic with both of these, and as a sort of middleman, exert herself to get along with them. She must always be patient, explaining to her patient in advance and as the anesthetic progresses, each step of the procedure. She must be as genuinely interested in each patient as if he were a close relative, as indeed he is in the family of God. This is applicable to all sorts of patients, be they old or young, crabby or cheerful, black, yellow, white, or should it occur, green.

The anesthetist must always maintain a pleasant personality, one that is pleasing, lovable, and ever-smiling. The provocation to shortness of temper, impatience, irritability, and a distracted mind during times of difficulty may be great, but the anesthetist must remember that the patient is probably very frightened and undoubtedly nervous and certainly in need of much reassuring. If only she will put herself in his place, she will more readily perhaps understand his problems and the task of encouraging him will be made easier.

Perhaps it would be well if we dealt a bit more at length with the emotion of fear, for that will be encountered consistently by the anesthetist. Her scientific knowledge and technical ability may discover that some situations require the skillful use of words rather than drugs. Fright, fear, and anxiety are closely related, differing from each other mainly in intensity and duration.

The effects of prolonged anxiety on the physiological functions of the body are well known and should be of particular interest to the anesthetist. Anxiety is capable of causing profound changes in the blood pressure, heart rate, capillary permeability, minute volume output of the heart, blood flow, rate and depth of respiration and carbon dioxide content of the blood; all of which seriously affect the patient's physical reaction to the anesthetic.

Further, during periods of emotional tumult, muscular contraction shortens the diaphragm, making it difficult to draw a long breath. Ventilation is markedly modified, leading to sighing respirations. Also, almost any cardiac arrhythmia may occur as the result of emotional stress.

One of the most basic of fears encountered is that of suffocation, not being able to breathe. This is oftentimes associated with the sight of the mask. The patient may have memories of the time when an ether mask was slapped on his face, as well as other unfortunate experiences. Modern anesthesia is so new that for the great majority of patients the procedures are totally unfamiliar; they

understand neither the equipment, the procedures, nor the effects they may expect to feel upon themselves.

Intellectually the patient may realize that his fears are groundless, but unfortunately fear is not controlled by reason. It is an emotion and when aroused, it is not subject at all to voluntary control. Therefore, it is up to the sympathetic and understanding anesthetist to work with the patient, help him find outside strength to face what is for him an ordeal, and allay the fears which overwhelm him.

Today a psychological orientation is taken for granted in hospital procedures. There is an increasing sensitivity to persons as the old mechanistic viewpoint is being abandoned. One must, therefore, emphasize the dualistic nature of man: his body and his soul, the *psyche* and the *soma,* realizing that no disease is entirely mental or entirely physical. Proper consideration must be given to both factors. To put it succinctly, in modern procedures more emphasis must be placed on the patient who has the operation than on just the operation itself.

The anesthetist must keep in mind that she is dealing not primarily with gases and machines, but with thinking, feeling, living, human beings; people who in addition to having diseased gall bladders, hernias, and various types of pathology, have worries, fears, anxieties, and other emotions.

The question arises, how do you help your patient overcome his fears? It cannot be done merely by telling him not to be upset. This adds to his burden; he must then pretend he is not afraid. He must force his feelings underground, from whence they may reappear in a disguised and uncontrollable way.

Neither is reasoning with him the answer. As previously stated, fear is not a reasoning thing. The patient will only feel misunderstood. This, however, is not to say that the procedures must not be explained to him, simply, in a manner which he can understand. For if he can be prepared to follow each step of the anesthetic procedure, his fear of the unknown will be lessened, and he will be less likely to fight the help the anesthetist is trying to give him.

The other psychological aid the anesthetist can give her patient is equally simple. She must be a good listener. As she would wish, were she in her patient's place, she must on her pre-operative visit, let him talk out his own feelings, explain his own situation and fears and then think through his own problems. Only then, accepting her patient as he is, by friendly sympathy, can the anesthetist help his fears to disappear. Here, as in all of life, the most important thing for the anesthetist to remember is the old, tried and true, Golden Rule. For who among us has never felt fear, and from this fear, know what is needed.

The practice of anesthesia, like the entire field of medicine, is an art as well as a science. As a science, the techniques of anesthesia can be mastered with considerable skill and rather quickly, but as an art, anesthesia requires the constant cultivation of these essential qualifications through careful nurturing, experience, and practice. Only then will the anesthetist become an efficient and integral member of the operating team.

What the Ophthalmologist Requires of the Anesthetist

Wendell L. Hughes, M.D.*
New York

The Opthalmologist has the same general requirements of an anesthetist as any other surgeon, in that he wishes his patient safely under control during surgery and, in addition, there are some special requirements. In general it may be said that the multitudinous developments with improved methods in recent years have greatly increased the safety of general anesthesia. It is, of course, assumed that general anesthesia is the type that is referred to, since all of the local anesthesia in this area is given by the surgeon himself and spinal anesthesia is inapplicable.

The most common procedures about the eye necessitating general anesthesia are: 1. Almost all procedures in children under ten, and in many up to about eighteen years, depending on the emotional development and control of the individual patient; 2. Many plastic and extensive lid and orbital procedures, especially where there is much scar tissue present where local anesthesia often takes poorly; 3. Painful inflamed or swollen conditions where the further swelling incident to local anesthesia is undesirable; 4. Extensive extraocular muscle operations, especially on the obliques and when deep orbital dissection is necessary; 5. Many times, when local anesthesia could well be used, the patient chooses a general anesthetic rather than local; and, finally, 6. Cataract, glaucoma, and other intraocular surgery.

I have left these indications until the last because I feel that it is only in the most extreme cases that there is any indication for a general anesthetic in these cases. It is only as a rarity that with proper preparation and technic these operations cannot be done absolutely painlessly except for one or two needle pricks to give the injections.

There are, however, those surgeons who prefer to do their cataracts under general anesthesia. The anesthesia in these cases is a quite critical part of the procedure. Heavy stertorous breathing makes the head move with each respiration, rendering it difficult to accurately place sutures, make exact incisions, to grasp the iris without injuring the intact lens capsule, remove capsule fragments without touching the vit-

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*Clinical Professor of Ophthalmology, New York University.

reous and the many other equisitely delicate manipulations necessary in this type of surgery. The difference between success and failure in eye surgery often lies in the ability to make movements accurate to the thickness of a hair. It is readily seen that the anesthesia must be very smooth throughout to avoid movements of the head, especially unexpected spasmodic ones such as were formerly so common with intravenous Sodium Pentothal.® Some surgeons have their anesthetists give curare, or some of the related muscle relaxants, to lessen movements of the patient. I think it is readily admitted that general anesthesia in these patients (mostly elderly, often in their seventies and eighties and occasionally nineties) does add one additional element of risk. This is particularly true if curare is used. I do not feel that it is as easy to operate for cataract with the patient under general anesthesia, and even if it were equally feasible, I do not believe that the additional risk, however slight it may be, is justified as a routine procedure in these elderly patients.

As to the preparation of the patient for anesthesia and the anesthetic agent used, this varies with the individual anesthetist and patient. There should be consultation with the surgeon as to the specific requirements for the case, including details of the particular procedure involved, the estimated length of time and depth of anesthesia required, and knowledge of the general condition of the patient. The surgeon should discuss the case with the anesthetist and then let the anesthetist work out the details.

In children the preparation for anesthesia is particularly important. It is routine in our hospital to give our young patients, from two years of age up to sixteen or so, rectal avertin (80 mg. per kilo).

An enema is given the night before operation and on the morning of surgery. Then, one-half hour prior to the the time of surgery, the avertin is given rectally while the child is still in his bed, and a long strip of adhesive, placed transversely, holds the buttocks together to aid in retention of the solution. The child becomes drowsy and by the time he is taken to the operating room he is sleeping.

The induction is usually with vinethene and ether on a mask until intubation. The anesthesia is then maintained with ether and nitrous oxide. The child may struggle a little when the inhalation anesthesia is started, but he does not remember any of the details. The drowsiness lasts for several hours postoperatively and his room is kept quiet to encourage this sleep as long as possible.

The amnesia induced by the avertin is particularly desirable as it lasts for several hours. If the patient has any nausea or vomiting, he rarely remembers it at all. Later, when the child comes into the office for dressings, he never mentions anything about the anesthetic and it is much easier to deal with him than in the olden days when preliminary sedation was not practiced. The use of the avertin lessens the amount of anesthetic necessary for maintenance.

Often a small dose of atropine and/or scopolamine is given preoperatively to lessen pharyngeal and tracheal secretions. In adults, after preparation with one of the newer tranquilizers and anti-emetics, induction is usually by an intravenous agent such

as Pentothal® Sodium or one of the newer preparations such as surital. Then anesthesia is carried on with nitrous oxide and ether after intubation.

If there is any suggestion of a glaucomatous condition, atropine injection and Surital® should be given with great caution and only on careful consultation with the surgeon. Either of these agents may cause a rise of intraocular pressure in a predisposed patient, with serious consequences such as an acute glaucomatous attack in one or both eyes. Cyclopropane tends to promote bleeding and should be avoided, especially in intraocular surgery and plastic cases.

The surgeon also expects of the anesthetist that he and his apparatus will be out of the way during surgery. This is particularly true in the case of eye surgery as some of the usual inhalation and intubation apparatus protrudes straight forward from the patient's mouth, and it is difficult to drape with sterile drapes and still maintain unobstructed light and visibility in the operative area. Allowance must be made for placement of the instrument table over the patient's chest. Also, if there are many observers watching the surgery, the anesthetist and his apparatus should not interfere with their ability to watch the operative procedure. This is, naturally, of secondary importance but can be attained frequently with a little planning.

When it is necessary to take mucous membrane grafts or work in the mouth for any reason, the tubes, mouth gags and necessary apparatus must be so placed as to allow access to the area to be operated on. Intubation may be by means of a nasal tube to keep the mouth clear. Also, in these cases, as in other cases where the nose is entered, there may be considerable blood and clots dropping back into the nasopharynx. Steps should be taken to insure that this blood or other debris is not inhaled. A small inflatable rubber collar around the intubation tube which closes off the trachea is useful for this purpose.

There is need for equipment to be designed that will make it possible to remove intubation apparatus more completely away from the operative field and out of the way of the illumination in all eye cases. Very often, the tube sticks straight up out of the mouth when it could be designed with a bend so that it could come out of the angle of the mouth so that there would be little or no elevation of the drapes in the mouth area. When the head is tilted back, this apparatus frequently makes the draping of the patient difficult and when it is in place it obstructs illumination.

Also, the eye surgeon expects that the anesthetist will handle emergencies incident to the anesthesia so that he may be free to carry out the necessary surgery. He expects the anesthetist to have the necessary apparatus available to handle cardiac and respiratory emergencies. He is expected to have an electrical stimulating apparatus to stop fibrillation and start normal cardiac rhythm when applied to the heart in cases of acute cardiac failure. Of course, he is expected to warn the surgeon of impending trouble so that the surgeon can be prepared to stop whatever he is doing and expose and massage the heart through the chest wall, if necessary, in a matter of seconds.

The anesthetist also expects the surgeon to be able to cooperate in such exposure at a moment's notice. Sometimes this is difficult, but there must be no question about it when necessary to save a life as there are only about three minutes of time in which to start circulation again to prevent permanent cerebral damage.

Respiratory failure usually gives warning to the anesthetist and he should notify the surgeon of the condition of the patient and of the possibility of necessarily stopping the anesthesia. This is especially so in long cases and requires constant vigilance on the part of the anesthetist in relation to cardiac sounds and rhythm, pulse and blood pressure, as well as rhythm, type, depth and rate of respirations. A stethescope taped to the chest is necessary for the proper hearing of the heart sounds. In the old open ether methods, the surgeon was well aware of any change in respiration, but with intubation he is often hardly aware of the patient breathing through the tube and must depend upon the anesthetist to tell him of changes taking place. Pressure on the eye will sometimes produce bradycardia. This can be lessened by the use of atropine and the use of local anesthesia.

Loss of blood is only an occasional problem in eye surgery, mainly occurring in plastic, orbital, or lacrimal sac surgery. If there is more bleeding than usual or expected, the surgeon should so advise the anesthetist so that the body fluids may be replaced during anesthesia.

Shock is rare in eye surgery unless the operation is prolonged and the anesthetist is usually aware of it by changes in blood pressure readings and the pulse and respiration, and he often takes measures to alleviate it without even advising the surgeon. Prevention, in the form of intravenous fluids and glucose, is routine in any anesthesia that is at all prolonged. Cardiac and respiratory stimulants may be given intravenously by injection through the intravenous tubes.

Very careful attention must be given to avoid injury to the vocal cords or other structures during intubation and the proper size tube should be inserted carefully.

The anesthetist should attend to the patient or see that he is in trained, capable hands until the patient is at least semi-conscious and the reflexes re-established. For this purpose, most hospitals now have a recovery room with trained personnel in charge and proper equipment at hand to handle emergencies. The anesthetist should check the patient's condition the next day or two to see if any complications ensue, such as injury to the vocal cords, lung or cardiac complications.

In general, the ophthalmolgist expects the anesthetist to give a safe anesthesia, to keep the patient quiet without complication, to take care of most emergencies, and to relieve him of worries about the patient, except in relation to the surgery which is the main purpose of the anesthetic in the first place. He expects him to do this and stay out of the way of the surgeon, nurses, and everybody else in the operating room.

Anesthesia in a Psychiatric Hospital

Edward J. Tracy, C.R.N.A.*
East Islip, N. Y.

The material for this paper is based on four years' experience as anesthetist in a psychiatric hospital. The Central Islip State Hospital of New York State Department of Mental Hygiene is the second largest hospital in the system with a patient population around 10,000.

There are two buildings in which surgery of almost every type is performed. The types of cases are the same as are found in any general hospital. The present case load averages about three major operations a day. In addition to surgical and obstetric anesthesia, the anesthetist frequently plays an important role in the Neurosurgical Department, in which there is also a Research Unit.

Work in a psychiatric setting offers a stimulating and frequently an exciting experience. In some respects anesthesia may have aspects similar to those in veterinary anesthesia. Inability of some patients to communicate, often results in poor rapport between him and the anesthetist. Difficulties experienced by the so-called "normal" patients are certainly interesting enough for the anesthetist; however, with the psychiatric patient the whole gamut of reaction, from utter detachment to sheer panic at the thought of surgery are encountered.

Fortunately, at present, it is possible to visit each patient before he is brought to the operating room. When making these preoperative rounds an attempt is made to explain something of what the patient will experience. The psychiatric nurses and the attendants give many cues upon which an approach may be based. Conferences, and the give and take of information between the anesthetist, the operating room staff and the ward personnel, ultimately make the experience for the patient as atraumatic as is possible.

Much credit for the preparation of the patient for anesthesia must be given the resident Protestant, Catholic and Jewish Chaplains. We have the service of the Chaplains in the hospital 24 hours a day and they expertly allay many of the patient's anxieties.

Usually, after the patient is seen preoperatively, he is quite willing to verbalize his feelings about the impending surgery. Fortunately, during the pre-surgery visit, much of the insecurity that would lead perhaps to pathological fear is re-channeled or controlled.

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*Anesthetist at Central Islip State Hospital, Central Islip, N.Y.

Presented at the American Association of Nurse Anesthetists Annual Meeting, Atlantic City, October 3, 1957.

The premedication can be, and usually is, very difficult to determine. A major part of the surgery is done on debilitated and geriatric patients. They are debilitated, not due to the diets by any means, as the food is excellent and they also have supplementary feeding, but it is rather due to their mental conditions. The patient's bowel habits and oral hygiene are often very poor. Because of these factors it is likely that the patient will be over-medicated if ordinary dosages are used. I prefer that the patient be under-medicated because of his usually poor physical condition.

Where patients have been given tranquilizing drugs, such as Thorazine, for any length of time, the amount of premedication or anesthesia would not be less, as they probably would with a patient who had received a tranquilizing drug for the first time.

General anesthesia is usually preferred when dealing with the psychiatric patient. The reason we seldom use regional anesthesia is that many of the patients are prone to be disturbed or uncooperative. The catatonic patient who is given regional anesthesia may not give evidence of ineffective results until he becomes disturbed. He may never show any sign of pain but later on he will remember.

When possible, before starting the anesthesia, check the patient for foreign bodies. You never know what you may find in his mouth, ears or nose. Many times the search for foreign objects may not be accomplished until the patient is anesthetized. Always be prepared to discover after the patient has been anesthetized that he has eaten a nice large meal which the patient in the adjoining bed gave to him. Because of this possibility most surgical patients are intubated.

All of the popular technics of general anesthesia are used. Dental patients are intubated when they are to have multiple extractions. An average of 4 to 6 cases a month are done under general anesthesia. These patients are uncooperative and disturbed.

A slow, smooth induction with all patients is best but frequently a "crash" technic is necessary.

For geriatric patients during the past three years I have used the following method: (1) Thiopental (Pentothal Sodium®) induction, 75-100 mgm. of 2½% solution; (2) Nitrous Oxide and Oxygen in an 80-20 mixture with the non-rebreathing technic; (3) after a few minutes, 20-40 mgm. of succinylcholine is given intravenously; (4) direct vision intubation. The anesthesia is maintained with nitrous oxide and oxygen, 80-20, and intermittent injection of muscle relaxants as needed. Assisted respiration is always used. For long procedures, less muscle relaxant will be needed. At the end of the surgery the endotracheal tube is removed and 100% oxygen is given for a few minutes. The patient usually responds to his name when leaving the operating room.

All types of surgery are done with this technic. Age, poor physical condition, or both, are not contraindications for surgery. Patients with cardiac decompensation[1], asthma, marked cachexia and many other debilitating conditions have received this type of anesthesia. No cardiac arrest has occurred with this technic. With the younger patient ether is

also used according to the method described by Artusio[2] as Ether Analgesia.

Another facet of the anesthetist's work in a psychiatric hospital is the highly overactive patient. The cause of the overactivity may vary from reaction to psychotic ideation to organic deterioration. This type of patient brings the anesthetist into contact with members of the X-Ray Department where the patients may receive routine x-rays or diagnostic tests, such as arteriogram or pneumoencephalogram. Spinal taps, pelvic examinations, and other procedures in the clinic may also require anesthesia for these patients.

This all adds up to producing a harmonious relationship with persons in departments other than surgery, and also serves to demonstrate the usefulness of the nurse anesthetist in this type of hospital.

Some experiences may illustrate special problems that may confront the anesthetist.

One patient, following diagnostic x-ray for intestinal obstruction, was found to have the following foreign bodies in the intestinal tract: bobby pins, two sewing machine bobbins, straight sewing needle, eyebrow tweezer, lipstick container in two parts, safety pins and straight pins, plus some rolled up paper. In another instance, a patient was scheduled for a pelvic examination due to erosion and a suspicion of carcinoma. Examination revealed a bobby pin in the female urethra with a large calculus surrounding the pin. In other instances, patients have been found with glass in their intestines, or in the ears. There has also been on record the presence of silverware in a patient's stomach. Unusually large hernias or tumors are found in these patients.

The postoperative recovery period is interesting. Occasionally there is some temporary remission of the psychiatric problems suffered by the patient. This might be attributed to the private nursing care the patient receives postoperatively.

Physically the patients may either have an uneventful recovery, frequently becoming ambulatory as soon as they react from the anesthesia or they may run the gamut of complications.

A number of patients have removed the Levine tube immediately postoperatively. Several postoperative subtotal gastrectomies have removed the Levine tube and eaten other patients' food in less than one-half hour after returning to their ward — and no complications occurred!

Neurosurgery

Hemispherectomy.[3] Hemispherectomies were performed by Dandy in 1923, the report being published in 1928. The operation was for relief of infiltrating gliomas of the right hemisphere. The patient died because of the progressive growth of the malignancy but it was demonstrated that a patient could survive the removal of the right hemisphere although flaccid hemiplegias and permanent hemianesthesia resulted. Reports of the successful application of this operation continue. At Central Islip State Hospital, the only criteria for the indication of surgery is a motor deficit on one side associated with hemiatrophy and is most often performed for relief of spastic hemiplegia, severe mental retardation or intractable epilepsy. However, other symptoms should be present, the four most common being:

1. Chronic infantile hemiplegia with spasticity, behavior and character disorder, epilepsy of cortical type, normal or almost normal mental type.

2. Chronic infantile hemiplegia without disorder of behavior and personality.

3. Chronic infantile hemiplegia and disorders of behavior and personality without epilepsy (all authors agree on this indication).

4. Hemiplegia with normal retardation with epilepsy. (This combination is rarely regarded as an operative indication.)

Anesthesia

The anesthesia used is Sodium Pentothal® induction with Succinylcholine, 20-40 mgm. before intubation. A Pontocaine spray of ¼% is also used for intubation. Maintenance is conducted with nitrous oxide and oxygen 80-20 given by the non-rebreathing technic with assisted respiration. Actually the aim is to carry the patient in as light a plane of anesthesia as is possible so direct electroencephalograms may be made.

Because of the frequent use of electroencephalograms during the case by the surgeons, we put 1-2 cc of ¼% Pontocaine through the endotracheal tube, and lightly spray the pharynx intermittently during surgery. Every two hours the patient breathes oxygen for about 15 minutes.

As soon as the dura and most of the glia is closed, oxygen only is given to the patient. Usually when the last few skin sutures are being inserted, the patient is moving on the table. Complete reaction from the anesthesia usually takes about two hours.

The results vary according to the disease and to the severity of the symptoms. In infantile hemiplegia and mental retardation there is no evidence of improvement. In epilepsy the number of attacks are greatly reduced. Patients with behavior or personality disorders are benefited.

Lobotomy

Four years ago, when I first arrived at this hospital, lobotomies were very common, and an average of ten to twelve were performed each month. The primary purpose was to make the patient more amenable to institutionalization. Since the advent of tranquilizers, this operation is very rarely used, lobotomy being done only when drugs or other therapy have been unsuccessful. The operation is still used for relief of pain from such conditions as carcinoma of the genito-urinary system.

Hypothermia

Hypothermia is used in psychiatric therapy. The hypothermia blanket method is used. Temperatures are lowered to about 85° F., and often lowering to about 80° F. All types of anesthesia have been used during the cooling phase. This type of therapy shows promising results.

Extrapyramidal Disorders

Much of Dr. Irving S. Cooper's[4] work on the Surgical Occlusion of the Anterior Choroidal Artery, started in Central Islip. Because of the new surgical procedure of chemopallidectomy, which has a lower mortality rate and can be used on a much older age group, Surgical Occlusion of the Anterior Choroidal Artery is seldom done. When it is performed, it is usually on patients under 55 years of age.

Dr. Irving S. Cooper's work on Parkinsonism also started at this hospital. The Globus Pallidus is the

area of the brain where the neurosurgeon is able to relieve many of the symptoms of Parkinsonism. About 1937, Bucy, Case and Klemie devised operations to alleviate the tremor of Parkinsonism. Various other procedures were developed. However, Meyer, in 1940, decided the risk was too great to warrant the general use of this procedure. Spiegel and Wycis[5] developed a stereotactic instrument. Numerous modifications have been developed since this instrument was first introduced.

Most authors agree this is the treatment of choice for Parkinsonism. The procedure involves the placement of a polyethylene catheter into the Globus Pallidus after a pneumoencephalogram. The position of the catheter is checked by x-ray; then procaine is injected. The catheter is left in place and repeated injections of absolute alcohol are given over a period of 7 to 10 days. This causes a permanent neurolytic lesion. From reports in the literature the treatment appears to give permanent relief of symptoms.

The preferred method of anesthesia is local infiltration. Many surgeons prefer that the involuntary movement be somewhat controlled for the procedure. To do this, intermittent injection of 25 mgm. of Sodium Pentothal® is used. This method is effective. Patients that are uncooperative must have a patent airway assured by endotracheal intubation as it is frequently difficult for the anesthetist to get near the patient's head when the stereotactic instrument is in position. The injections are usually performed a few days postoperatively. This method is now used for many Extrapyramidal Disorders, such as Huntington's Chorea and Dystonia.

Summary

The Anesthetist plays an important role in the care of the psychiatric patient. Working in a Mental Hygiene Hospital can be, and is, very gratifying—it is a constant challenge.

Bibliography

1. Barrett, R. H.: The Geriatric Patient and Anesthesia. J. Am. A. Nurse Anesthetists 24: 239-248 (Nov.) 1956.
2. Artusio, J. F.: Ether Analgesia During Major Surgery. J.A.M.A 157: 33-36 (Jan. 1) 1955.
3. Morello, Aldo: Personal Communication.
4. Cooper, I. S., and Poloukhine, N.: The Globus Pallidus as a Surgical Target. Am. Geriatrics Soc. J. 4: 1182-1207 (Dec.) 1956.
5. Spiegel, E. A., and Wycis, H. T.: Stereoencephalotomy (Thalamotomy and Related Procedures). Vol. 1. New York. Grune & Stratton, 1952.

Acknowledgment

I am indebted to Francis J. O'Neill, M.D., Director of Central Islip State Hospital, and all the members of the Staff for their helpful cooperation.

Notes and Case Reports

A Modified Open End "T" Tube

The open end nonrebreathing principle of anesthesia was instituted by Ayre with his development of the open end "T" tube.

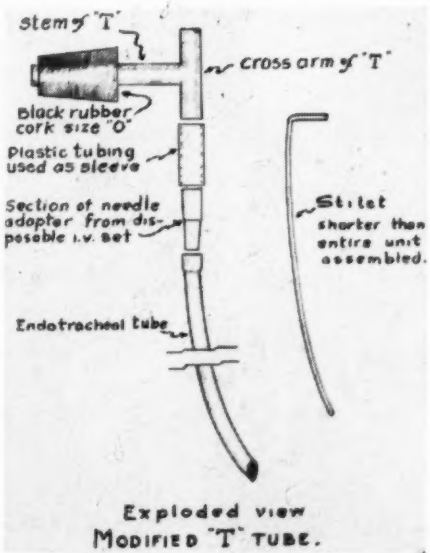
The purpose of this paper is to present a modification of a piece of anesthetic equipment which has been particularly adapted to pediatric anesthesia with an endotracheal tube.

Slocum modified Ayre's "T" tube by adding a connector with a vent and shaping the whole assembly in a curve similar to the well known "ether hook".

The open end non-rebreathing principle of anesthesia has definite advantages in pediatric anesthesia. These are associated with decreasing "dead space" and respiratory resistance. Most commercially produced connecting pieces used with endotracheal tubes in pediatric procedures add a proportionately high percentage of "dead space", increasing the carbon dioxide tensions and producing characteristic physiological responses which are detrimental to children under surgery. The added space itself imposes an additional burden on respiratory effort. "T" tubes do not add "dead space" and materially reduce resistance in respiration.

Construction of "T" tubes used in the past has necessitated the passage of the inhaled and exhaled mixture around a 90° turn in the assembly. Aspiration of secretions cannot be accomplished around this 90° angle and to do so involves disconnecting the "T" from the endotracheal tube. Modification, to elimate the necessity of disconnecting the "T" was accomplished by making a permanent attachment of the endotracheal tube to one limb of the "T" cross arm. This produced a straight thru relationship between the endotracheal tube and the open end of the "T" allowing easy aspiration of secretions, and in addition, a short stilet can be used to add rigidity and help direct the end of the endotracheal tube at insertion.

The actual construction of this modified version of the "T" became a sort of "do it yourself" pro-



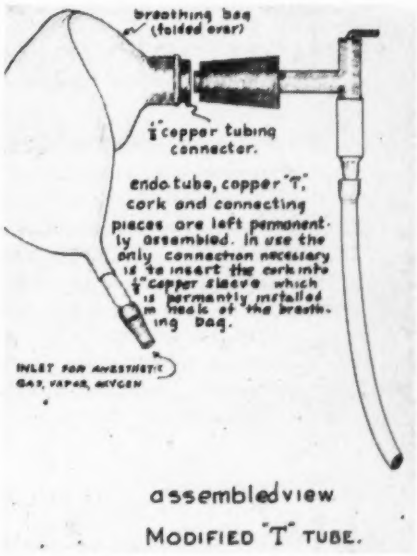
Exploded view
Modified "T" tube.

ject. Several models were made and their use discussed and criticized before the final model was built.

As shown in the first view the needle adapter from a disposable intravenous infusion set is inserted directly into the endotracheal tube. This is used only on sizes "0" and "1" endotracheal tubes. The part of the adapter which fits inside the needle hub was found to be a snug fit in the "0" tube and the larger part of the adapter was found to fit snugly in a "1" tube. Sizes "2" and "3" endotracheal tubes fit directly on the cross arm of the "T" and do not need an intervening part, thus one disposable intravenous infusion adapter will suffice for one set of "T" assemblies. The plastic tubing shown was salvaged from a blood and plasma set and it fits snugly over the cross arm and the larger part of the needle adapter. Abbott needle adapters were used because of their thinner walls and rigidity; they may also be autoclaved without deterioration. The plastic tubing was obtained from a Cutter blood and plasma infusion set. It is superior to rubber tubing because it will withstand more bending without leaking. Plastic shrinks with age so it should fit closer as it gets older.

The rubber cork is forced on the long stem of the "T" with the use of a vise and cannot be removed by hand. It is a size "0" with one perforation.

The ½" copper tubing connector used in the end of the breathing bag is a standard item obtainable in hardware and plumbing supply stores. Its purpose is to facilitate positive and rapid connection of the "T" assembly to the breathing bag after the endotracheal tube is inserted in the trachea. These "T" assemblies are left permanently attached to the endotracheal tubes as shown in the assembled view. This leaves only one connection to be made in using this set-up. The cost of a complete set of four, with tubes and one bag, if the "T"s are made by the user, should be about six or seven dollars. The tubes and the bag constitute the larger part of this cost.



MODIFIED "T" TUBE.

These modified "T" sets have been made for and used by several anesthetists and two anesthesiologists. To date they have been used on approximately 25 patients, ranging in age from two months to six years, and in procedures such as Plastic, Neuro surgery, Urological, surgery in prone position, and E.N.T. The only adverse comment so far is that in the E.N.T procedure the tube was

slightly short, a fault easily remedied.

While this is not presented as an original feat of anesthesia equipment manufacture it does seem to serve a useful purpose and has merit in the matter of reducing the possibility of carbon dioxide accumulation, respiratory resistance, number of connections needed in using and the cost is small as compared to the usual equipment purchasable.

The following is a list of materials used:
¼" outside diameter copper tubing
½" copper tubing connectors
"0", 1, 2, 3 endotracheal tubes
Discarded intravenous infusion sets (Abbot)
Part of dicarded blood and plasma infusion set (Cutter)
½ liter or 1 liter bag with tail
The tools used in the construction were:
Drill press and proper sized bits
Hacksaw
Polishing wheels or steel wool
Soldering equipment (propane torch) Vise

BIBLIOGRAPHY

Collins, Vincent J.: Anesthesiology. Lea & Febiger, Philadelphia, 1952, pages 97 and 391.

JOHN J. O'CALLAGHAN, R. N.
Instructor, Post Graduate Course in Anesthesia
University of Tennessee, Memphis

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Legislation

Emanuel Hayt, LLB., Counsel A.A.N.A.

Immunity of Connecticut Hospitals Held to Bar Action for Negligence of Nurses

This action was brought to recover damages for the injuries and resulting death of the plaintiff's decedent. At the time of the occurrence complained of, she was a patient in the Bridgeport Hospital. That institution and a supervisor of nurses are the defendants. The jury returned a verdict in favor of the plaintiff against both defendants.

From the evidence it appears that the jury could have found facts as follows: On January 20, 1952, the plaintiff's decedent, Mrs. Purowski, a woman of sixty-four years of age, was admitted to the defendant hospital for treatment for a bronchial asthma condition. She was assigned to ward 2 west. She occupied room 216, a small room which was part of the ward. She was under the care of the nursing personnel having charge of the ward and was a ward patient. She was put in an oxygen tent and given seconal and on January 23 she was improved and her own physician ordered that she be kept out of oxygen. On the shift beginning at 11 p.m. on January 23 and ending at 7 a.m. on January 24, Lillian Jenulesen was the nurse in charge of the patients in ward 2 west. Early in the morning of January 24 she noticed that Mrs. Purowski was becoming very restless and confused and was having hallucinations. It was impossible for Mrs. Jenulesen to keep a constant watch over Mrs. Purowski. On several occasions Mrs. Jenulesen advised the night supervisor of the condition of the patient and finally, at about 4 a.m., reported that Mrs. Purowski was getting worse and requested additional help in the ward. No additional help was received. Shortly after 6 a.m., Mrs. Jenulesen heard a thud in room 216, entered the room and saw that the patient's bed was empty. Almost immediately, Mrs. Purowski was found lying on the sidewalk two stories below, having sustained serious injuries which resulted in her death. She had either fallen or jumped from the window of room 216 at a time when she was disoriented.

The plaintiff offered no evidence showing that this defendant was negligent in its selection of its servants and agents, or showing that it failed to provide facilities and staffing adequate to supply the needs of the hospital in conformity with the provisions made by similar hospitals similarly situated and was thereby negligent, or showing that it was negligent because it permitted the ward in question to be presided over by a nurse who, although a graduate

nurse, was not a registered one. The question presented, therefore, is whether there was offered at the trial evidence upon which reasonable persons could have reached the conclusion that the decedent's injuries were caused by the hospital's negligence in any one or more of the foregoing respects. There is no occasion to discuss the claim having to do with the defense of charitable immunity. This court has just decided that the doctrine still prevails in Connecticut.

(Parowski v. Bridgeport Hospital, 7 CCH Neg. Cases 2d 554—Conn.)

Hospital Record Entries Should Have Been Read in Blood Transfusion Case

Ten days following an operation for the removal of a tumor, Mrs. Lucille Joseph died in the L.D.S. Hospital of a "lower nephron nephrosis" (inflammation of the kidneys). Plaintiff, her husband, brought this action for himself and children for wrongful death, alleging that the hospital had negligently administered a transfusion of incompatible blood which brought on the kidney infection, proximately causing her death.

The two basic issues contested by the parties were: (1) Did plaintiff's decedent receive an incompatible blood transfusion from which she died; and (2) if so, was the defendant hospital negligent in connection with administering it, or in failing to stop it after an unfavorable reaction was noticed. The case was submitted to the jury which returned a verdict of no cause of action.

The controversy over the rulings on evidence devolves upon the sustaining of defendant's objection to permitting the plaintiff's counsel to read and use in his argument to the jury certain entries upon the hospital record made by two doctors, V. L. Rees and Kenneth A. Crockett, who had been called in to consult with respect to the treatment of Mrs. Joseph. The notations which counsel indicated a desire to read are as follows:

"Pelvic Laparoling 4-453 followed almost immediately by a chill and dark urine.

. . . This pt is going into some type of renal decompensation possible on the basis of a transfusion reaction . . ." Signed "V. L. Rees."

And at the bottom of the same page of the Progress Notes:

"This is undoubtedly a Lower Nephrone Syndrome from hemolitic Blood transfusion . . ." Signed "KAC".

The above entries have a direct bearing on a critical and disputed issue: whether Mrs. Joseph received a transfusion of incompatible blood which caused her death.

During the trial, Dr. Val Sundwall, who had performed the initial operation on April 4, testified that in his opinion the patient probably died as a result of a blood transfusion reaction. However, Dr. John H. Carlquist, the pathologist and director of laboratories at the hospital, who was called in on the case and made tests of the patient after difficulties had developed, and who qualified as an expert in the field of blood transfusions and blood typing, being subjected to a searching examination by counsel for plaintiffs, was obviously evasive and persistently refused to concede that there was any definite proof that Mrs. Joseph either received, or died as a result of, a transfusion reaction.

"The fact that he repeatedly refused to admit that there was any

evidence from which a conclusion could be drawn that the patient had had an incompatible blood transfusion or that her death resulted from one, shows plainly that the entries in the record did not represent merely a recapitulation of other testimony brought out at the trial, but could reasonably be interpreted as opposed to his testimony. It was therefore evidence of extreme importance to the plaintiff's theory as to the cause of death.

"Defendant urges that inasmuch as the doctors who made the notations were not employees of the hospital, such entries were neither admissible nor binding upon it. Anent defendant's contention in regard to entries which might be made by unauthorized persons having no connection with it, we remark aside that if some meddler, having no duty for legitimate business doing so, made entries upon the hospital record, that would be subject to explanation by the hospital, facts not present here.

"In view of the fact that there is such substantial doubt that we cannot, with any degree of assurance, affirm that the use of such evidence would not have been helpful to the plaintiff, the doubt should be resolved in favor of allowing him to have a full and fair presentation of his cause to the jury."

(Joseph v. W.H. Groves Latter Day Saints Hospital, 7 CCH Neg. Cases 2d 767—Utah)

Abstracts

Kory, R. C.: Routine measurement of respiratory rate. An expensive tribute to tradition. J.A.M.A. 165: 448-450 (Oct. 5) 1957.

"The measurement of the respiratory rate in hospital patients has been a routine procedure for many years... It is the purpose of this study (1) to reexamine the clinical value of the routine measurement of the respiratory rate, (2) to assess the accuracy of such measurements in representative hospitals, and (3) to point out the approximate annual cost of personnel time used in this routine procedure in our hospitals . . ..

"The data herein presented demonstrate that each year over 3,500,000 hours of personnel time (representing over $5,500,000) are devoted to an unreliable, largely useless routine which has been continued in hospital procedure wholly because of tradition. The thesis espoused in this report is that the elimination of these routine measurements would in itself improve medical practice and patient care, by eliminating erroneous information from patients' hospital records and by freeing nursing personnel for more important duties. In place of this routine, the physician would specify those patients or particular wards in which he considered close observation of respiration necessary. The nurse, in turn, would observe the character as well as the rate of 'respirations' in such patients. Such a proposal should result in improved patient care and more accurate medical records and at the same time save over 3,500,000 hours of personnel time each year in United States hospitals."

Cull, W. A., and Hingson, R. A.: Dedication, education, and organization in the round-the-clock staffing of a modern obstetrical analgesia and anesthesia service. Bull. Maternal Welfare 4: 17-26 (Sept.-Oct.) 1957.

"Throughout America today obstetrical and gynecological services have been hindered in providing complete maternity service through serious shortage in anesthesia coverage . . . .

"If there are to be further reductions in material mortality consistent with the trend of spectacular progress during the past quarter of a century in reducing maternal mortality and infant mortality . . . special study, research and improvement must be effected in the areas still supporting a high incidence of maternal and infant mortality and morbidity: 1. The disproportionate loss of life of both mothers and babies among the Indian, Mexican, Negro and Puerto Rican peoples. 2. The high death rate among babies born to diabetic mothers. 3. The increased hazards and losses amongst premature infants. 4. The high morbidity and mortality among babies born through breech deliveries. 5. The relatively high mortality to both mothers and babies in cesarean deliveries. 6. The high infant and maternal losses in

pregnancies complicated by toxemia. All of these areas for research and further study belong in the orbit of a team in which obstetricians and anesthesiologists unite with other professional services with affiliated interests . . . .

"No one factor is responsible for the improvement in results and the improvement in anesthesia coverage in our department. It is a combination of the efforts of a dedicated staff; a well organized and planned program in which there is the greatest cooperation between hospital administrators, obstetricians, anesthesiologists, nurse anesthetists, residents in training and our supporting secretarial and statistical personnel. We feel certain that this type of organization can be reproduced in most of the large maternity departments in the United States, with the final result being safer and more complete maternity and infant care."

Lofstrom, Bertil.: Changes in blood volume in induced hypothermia. Acta anaesth. Scandinav. 1: 1-13, 1957.

"In earlier investigations . . . induced hypothermia was found to be accompanied by intravascular aggregation and impairment of capillary flow. The purpose of the present investigation was to determine whether any correlation could be demonstrated between the changes in the capillaries and changes in blood volume. It would also be of interest to examine whether the total amount of circulating hemoglobin was decreased after hypothermia as has been found to the true after fractures and burns... By determination of the erythrocyte sedimentation rate and the dye disappearance curves for Evans blue it might also be possible to form an opinion of the cause of intravascular aggregation observed during hypothermia . . . . A total of 71 rabbits weighing about 2 kg were used. . . .

"Control group of rabbits subjected to anesthesia only was included. It was observed that: The total plasma volume decreased during hypothermia (13 per cent and 20 per cent at 26° and 20° C, respectively, below that of the anesthesia group). This decrease reached values of 28 per cent and 35 per cent, respectively, below those obtained for the original preanesthetic plasma volume. During the rewarming period the plasma volume was restored.

"A reduction in the total amount of effectively circulating hemoglobin occurred at 20° C when an appreciable stagnation in the blood cells was observed in the peripheral vessels. After deep hypothermia (20° C) anemia developed of the same severity as that observed during hypothermia. It is suggested that intravascular aggregation might be the cause of the decrease in the white blood cell and platelet counts during hypothermia. Intravascular aggregation occurring during hypothermia appeared to be due to an increase in the protein and blood cell concentrations."

Axelrod, Julius and Cochin, Joseph: The inhibitory action of nalorphine on the enzymatic n-demethylation of narcotic drugs. J. Pharmacol. & Exper. Therap. 121: 107-112 (Sept.) 1957.

"It has been shown in this laboratory that a variety of narcotic drugs are N-demethylated by an enzyme system found in mammalian liver microsomes. . . . Since nalorphine blocks the pharmacological action of the same compounds that are attacked by this enzyme system . . . it was of interest to investigate whether or not its inhibitory action extends to the

biochemical process of N-demethylation described previously. During the course of the studies reported in this paper, it was found that nalorphine does exert an antagonistic action on these in vitro processes, as well as on pharmacological effects in vivo . . .

"Nalorphine and its analogues inhibit the N-demethylation of morphine and other narcotic drugs in rat-liver microsomal preparations. N-substituted normorphine derivatives with a 3-carbon chain linked to the nitrogen atom are the most potent inhibitors. Nalorphine is dealkylated to normorphine by enzymes in the rat liver microsomes and soluble supernatant fraction, which require triphosphopyridine nucleotide."

Seldin, H. M.: Survey of anesthetic fatalities in oral surgery and a review of the etiological factors in anesthetic deaths. J. Am. Dental Soc. Anesthesiology 5: 5-12 (Feb.) 1958.

"Anesthetic fatalities, when they occur in a dental office, are usually highly publicized in the press. These reports present a picture completely out of proportion to the frequency of such fatalities . . . . The employment of any anesthetic agent, regional or general, is accompanied by the danger of possible loss of life . . . .

"A comprehensive survey of the safety of anesthesia in the dental office was published by Seldin and Recant in 1955 . . . . In this comparative study only those anesthetic mortalities in hospitals and medical offices were used in which anesthesia had been administered for procedures of approximately similar severity and duration to those performed in dental offices. Only those medical cases where the physical status of the patient might be assumed to have been similar to that of patients usually encountered in dental and oral surgical procedures were included in the survey . . . . The survey was made from the records in the Medical Examiner's office of anesthetic deaths for the ten-year period 1943 to 1952 inclusive. It was estimated that during that ten-year period about 90,000,000 administrations of local anesthetics and about 1,000,000 administrations of general anesthetics were made by dentists in New York City.

"The ten-year total of anesthetic deaths was 1,867. Total anesthetic mortalities in dental offices was 8; anesthetic deaths during tonsillectomies and/or adenoidectomies was 51; and anesthetic fatalities during ophthalmological procedures was 15... Of the ten-year total of anesthetic deaths in dental offices, two were caused by local anesthetics and six by general anesthetics. If we consider the fact that about one general anesthetic is administered to every 90 local anesthetics, we see that percentage-wise the local anesthesia safety record surpasses by far the excellent record of general anesthesia.

"Recently I made a nation-wide survey of anesthetic mortalities in oral surgery for the years 1950 to 1956 inclusive . . . . The 314 completed questionnaires indicated that these oral surgeons administered approximately 7,956,627 anesthetics in their offices and/or hospitals. Of these, 4,244,449 were local and 3,712,178, general. There were 59 fatalities reported. Fifteen occurred in their offices, 43 occurred in hospitals and one in a patient's home . . . . Of the 59 anesthetic deaths three were caused by regional anesthetics and 56 by general anesthetics. Of the three local anesthetic deaths one was in a hospital and two in offices. Of

the 56 general anesthetic deaths 42 occurred in hospitals, 13 occurred in offices and one in a patient's home, in spite of the fact that there were significantly more general and local anesthetics administered at the offices of oral surgeons than at hospitals for oral surgery. Intravenous barbiturates were administered in 37 of the 59 mortalities due to general anesthetics . . . .

"Intravenous barbiturates, when employed in anesthetic doses, produce depression of respiration and circulation. The fact that 37 of the 59 deaths occurred where intravenous anesthesia was employed and 19 fatalities where sodium Pentothal was the sole agent would indicate that the intravenous barbiturates in general anesthesia are not as innocuous as some people claim them to be . . . . The excellent safety record of local anesthesia in dental offices is due in large measure to small dosage. This afety can be further enhanced by using an aspirating syringe as advocated by Monheim."

Questions and Answers: Explosion hazard in the recovery room. J.A.M.A. 166: 711 (Feb. 8) 1958.

"To the editor:—The question of explosion hazards in the modern recovery room has arisen in our hospital. Please answer the following questions. 1. What are the explosion hazards in the modern recovery room? 2. Do the gases given off by the patient after admission to the recovery room constitute an explosion hazard? 3. What attire would be considered proper for recovery room personnel? . . . .

"Answer.—The explosion hazards in a modern recovery room are essentially the same as those in a modern operating room. Oxygen, ether, acetone, and alcohol are present, and every normal precaution should be taken to prevent fire or explosion . . . . The use of conductive clothing and proper conductive floors and grounding of all apparatus is a must. All electrical apparatus should be in excellent repair and should bear the Underwriters Laboratories' seal of approval. There has never been brought to the attention of medical authorities any case in which the gases given off by the patient constitute an explosion hazard. The attire of personnel in the recovery room should be the same as that of operating room personnel. For example, the circulating nurse in an operating room should be carefully capped, gowned, and masked. There should be washing facilities in the room so that individual care can be given to each patient without chances of cross-infection. The nurse's clothing should be of the proper nature, as should any blankets or other material used to cover the patient. As a general rule, the precautions and techniques in a recovery room should be very similar to those enforced in the operating room."

Axelrod, Julius and Cochin, Joseph: The inhibitory action of nalorphine on the enzymatic n-demethylation of narcotic drugs. J. Pharmacol. & Exper. Therap. 121: 107-112 (Sept.) 1957.

"It has been shown in this laboratory that a variety of narcotic drugs are N-demethylated by an enzyme system found in mammalian liver microsomes. . . . Since nalorphine blocks the pharmacological action of the same compounds that are attacked by this enzyme system . . . it was of interest to investigate whether or not its inhibitory action extends to the biochemical process of N-demethylation described previ-

ously. During the course of the studies reported in this paper, it was found that nalorphine does exert an antagonistic action on these in vitro processes, as well as on pharmacological effects in vivo. . . .

"Nalorphine and its analogues inhibit the N-demethylation of morphine and other narcotic drugs in rat-liver microsomal preparations. N-substituted normorphine derivatives with a 3-carbon chain linked to the nitrogen atom are the most potent inhibitors. Nalorphine is dealkylated to normorphine by enzymes in the rat liver microsomes and soluble supernatant fraction, which require triphosphopyridine nucleotide."

Batterman, R. C., Golbey, Maurice, Grossman, A. J., and Leifer, Paul: Analgesic effectiveness of orally administered ethoheptazine in man. Am. J. M. Sc. 234: 413-419 (Oct.) 1957.

"The utilization of . . . ethoheptazine was evaluated in 4 groups of patients requiring analgesics for a wide variety of medical and surgical conditions. It was also possible in 2 groups of patients to compare the effectiveness of ethoheptazine when administered concomitantly with aspirin. . . .

"Satisfactory analgesia regardless of etiology of painful state was achieved in 73% of ambulatory patients. Sixty-two per cent of hospitalized patients responded, but required a higher dosage. Postpartum pain was satisfactorily controlled in 82% of the patients treated with ethoheptazine alone and in every instance treated with combined ethoheptazine and aspirin. The occurrence of insignificant untoward reactions was noted as 4% for both ambulatory and hospitalized patients."

Keeri-Szanto, Michael and Labarre, Jules: Buthalitone sodium anaesthesia; drug consumption and serum protein studies. Canad. Anaesthetists' Soc. J. 4: 338-344 (July) 1957.

"Buthalitone sodium is the sodium salt of 5,5-allyl-(2'methyl-propyl)-thiobarbituric acid. It is known in Great Britain as 'Transithal' and on the European continent as 'Baytinal.' We recently had the opportunity to use buthalitone sodium. . . . Thirty-seven patients undergoing uterine curettage were the subjects of our study. . . .

"Buthalitone sodium has a shorter action than other thiobarbiturates now available. It appears to be free of harmful side effects and produces relatively little respiratory depression. These characteristics indicate that its field of greatest usefulness is anaesthesia for minor surgery and office and dental procedures, subject to the usual precautions with thiobarbiturates. . . . Serum protein changes following buthalitone sodium anaesthesia were also studied. All protein fractions decreased while a_1-globulin showed a significant increase. This is interpreted as an early response to over-all stress rather than to any specific anaesthetic agent."

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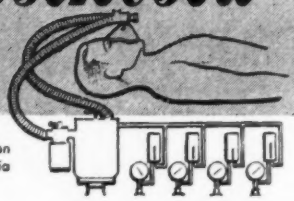


Electronic Aids in Precluding Cardiac Arrest

by Oscar Dallons, President,
Dallons Laboratories, Inc.,
Los Angeles, California

Editor's Note: Effective February 1, 1958 Ohio Chemical obtained the distribution franchise throughout the United States of America and Canada for "The Life-Saving Team" of electronic cardiological equipment manufactured by Dallons Laboratories, Inc. This step further expands the scope of Ohio Chemical's ability to better serve hospitals.

THE INTENSE DRAMA OF CARDIAC ARREST

The field of research in anesthesia in recent years has emphasized the urgent and constant need for the development of compact and portable equipment for the early detection of impending cardiac arrest or difficulty. In addition to the visual and auditory aids, compact, efficient emergency units were demanded.

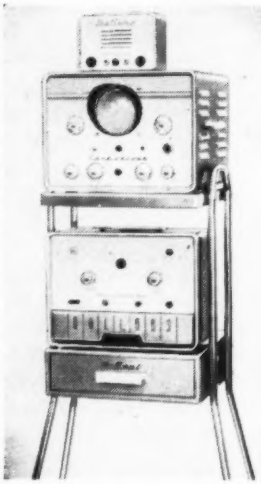
Eminent medical authorities have written with great concern on the subject of cardiac arrest agreeing that . . . the best treatment for cardiac arrest and ventricular fibrillation is PREVENTION. This is Preventive Medicine at its best.

The ever-increasing bibliography on the causes, detection and emergency treatment of cardiac arrest led Dallons Laboratories to develop equipment to meet this need. The portable cardioscope and cardiophone were designed for early detection of impending difficulty, and the Pacemaker and the Defibrillator for the control of the electronic action of the heart in the event of an emergency.

The report "Cardiac Arrest" by Hewlett et al[1] begins — *"No more intense drama* in the operating pavilion ever is enacted than that occasioned by the catastrophe of cardiac arrest." For this reason, Dallons has called their combination of a portable electrocardioscope and cardiophone (listed by Underwriters' Laboratories, Inc.) together with the Pacemaker and the Defibrillator, "The Life-Saving Team."

EARLY DETECTION OF IMPENDING CARDIAC ARREST VITAL

Warning signs of impending cardiac difficulties are manifest in the cardiorespiratory system. The oxygen system of the body is vital to life. The heart is needed to provide the dynamic pumping action to propel the oxygenated blood to the vital organs. Cole and Corday[2] warn: "Cardiac arrest is considered to have occurred when the heartbeat is no longer strong enough to be of hemodynamic significance. Since it results in failure of oxygen transport, every case of cardiac arrest is an emergency calling for immediate action, because the cells of the celebral cortex cannot survive long after oxygenated blood supply has been interrupted. Depending on the effectiveness of the resuscitative efforts within a very short period, the individual may recover completely, die in a few hours, or live longer in varying degrees of a decerebrate state."



Dallons Cardioscope, Cardiophone, Cardiac Defibrillator &5- Foot Stand.

Many electronic changes in the cardiac picture indicate impending cardiac difficulty. The functioning of the cardiovascular and the respiratory systems are interdependent. Failure of either the cardiovascular system or the respiratory system will be followed by failure of the other since they cannot function separately. Hosler[3] states life is a continuous process of oxygenation.

Johnstone[4] reports that as research in anesthesia develops, the attention of the anesthesiologist is being directed more and more to a closer study of the cardiovascular system under the varying conditions of surgery and anesthesia. The immediate success of all surgical and anesthetic procedures depends primarily on the patient's cardiovascular system and its ability to withstand the direct and indirect stresses to which it is being subjected.

Hosler[3] and Beck[5] stress the necessity for early detection of the signs of impending cardiac arrest with a warning of the urgency of the time element. Cole and Corday[2] emphasize the four-minute limit for cardiac resuscitation with the following comments: The effect of time is clearly

demonstrated. "Of the 'Under four-minute' group, 42% recovered completely; in the 'over four-minute' group 7% recovered; in the indeterminate group, none recovered. The two who recovered in the 'over four-minute' group both showed permanent nervous system damage; they represent 1% of the total of 132." They warn: "To reduce the danger of death or disability from this cause, physicians and surgeons must be trained to act with promptness and precision, solutions and apparatus must be ready for immediate use and *visual and auditory aids* must be used to determine the earliest signs of cardiac arrest. Sings of cardiorespiratory embarrassment, of which bradycardia was the most common, usually gave warning when stoppage was imminent."

ANESTHESIA HAS ENTERED THE ELECTRONIC AGE

It is a well-known fact that pulse palpation can be inaccurate and misleading. Blood pressure estimations are not a reliable index of myocardial function. Ordinary clinical signs may be misleading. For example, the color change of cyanosis is valueless as an early indication of anoxia; rather it might be considered a *terminal sign.*

The electrocardioscope provides the anesthesiologist and other members of the surgical team with a picture of the heart rate and rhythm, wandering pacemakers, the efficiency of the conducting tissue of the myocardium and may indicate changes in the position and size of the heart. The anesthesiologist can observe fluctuations of the autonomic tone occasioned by the use of the number of drugs and gases at his disposal. The cardioscope provides a valuable index of the electrolytic balance of the blood and is indispensable according to Johnstone[4] in determining what is the cause of the cardiovascular collapse of the anesthetized patient.

The use of the electrocardioscope and the cardiophone as diagnostic tools enable the anesthesiologist to alter technique or employ oxygen, gases, and drugs to avert impending cardiac difficulty before the usual clinical signs appear. This equipment is not merely a cardiac monitor; it is diagnostic and gives information *prior to disaster.* In the event of an unexpected cardiac arrest or a ventricular fibrillation, the cardioscope and cardiophone immediately differentiate between the two since the sound and appearance of the scopic picture of the arrest in no way resemble the fibrillation. *Without a cardioscope,* a thoracotomy would be necessary to observe the action of the heart.

Hewlett et al[1] declare "The value of unhurried preparation far exceeds the most heroic emergency efforts." Hosler[3] says "Every effort that is humanly possible should be spent in its (cardiac arrest) prevention." He further states that —"Regardless of the situation or condition it is possible for the physician to take control of the oxygen system for the patient and manage it for several hours, during which the patient cannot die. After a period of time, the control of the oxygen system must be given back to the patient. If conditions are such that the patient can properly control the system, then the resuscitation will be successful; otherwise he will expire."

All of the current reports on the prevention and the treatment of cardiac arrest agree that cardiac arrest or stoppage of the heart in the operating room is the enigma and challenge of present day surgery and anesthesia. There is very little doubt that in the vast majority of cardiac arrest cases, the "sudden catastrophies" are preceded by definite signs which give warning of impending failure. If prompt institution of effective therapy is achieved — when the danger signals occur — cardiac arrest can usually be prevented.

The electronic Defibrillator and the electronic external Pacemaker are used to restore and maintain the desired rhythm of the heart. However, it must be remembered that **a hypoxic heart may not respond to electrical stimulation while in the hypoxic condition.**

The external Pacemaker has been known to have maintained a normal rhythm of the heart in a Stokes-Adams syndrome for as long as eight days. It can restore the rhythm in a bradycardia when hypoxia is not present. However, Dallons Laboratories has never maintained that an electronic pacemaker is ever a substitute for cardiac massage together with immediate administration of 100% oxygen, when the heart goes into an actual cardiac arrest.

TIME IS OF THE ESSENCE

The cardioscope gives warning of the need of more oxygen. The cardioscope and phone warn in time of the need to change gases or alter technique. It is certainly not within the scope of this article to discuss the suggested methods of emergency treatment of either cardiac arrest or fibrillation. It is gratifying, however, to see the increasing number of surgeries across the nation that are employing visual and auditory aids to determine IMPENDING arrest. Unhurried preventive steps can be taken, proper electronic equipment for defibrillating and pacing the heart can be ready for immediate action so that a catastrophe can be averted. Prominent authorities declare that this preventive action should be used on all surgical cases and not merely on "suspect" cases. In the event of emergency, action should be taken with the speed and precision of a fire drill.

REFERENCES

1. HEWLETT, Thomas H., M.D., F.A.C.A., M.C.; GILPATRIC, Cleston W., M.D., M.C.; BOWERS, Warner F., F.A.C.S., M.C. — Cardiac Arrest. From the General Surgery Service, Brooke Army Hospital, Fort Sam Houston, Texas.
2. COLE, Seymour L., M.D., and CORDAY, Eliot, M.D., — Four-Minute Limit for Cardiac Resuscitation. From the Cardiac Clinic, Cedars of Lebanon Hospital, Los Angeles, Calif.
3. HOSLER, Robert M., M.D., F.A.C.S., Cleveland, Ohio — A Manual on Cardiac Resuscitation. Charles C Thomas Publisher, Bannerstone House, 301-327 E. Lawrence Ave., Springfield, Ill., U.S.A.
4. JOHNSTONE, Michael — Electrocardiography During Anaesthesia. British Journal of Anaesthesia, 1956 — 28, 579.
5. BECK, C. S. — Resuscitation for Cardiac Standstill and Ventricular Fibrillation Occurring During Operation. Am. J. Surg. 54:273 (Oct.) 1941.

Editor's Note: ***For more information please request medical reprints and other descriptive literature.***

Book Reviews

Inhalation Analgesia in Childbirth. By E. H. Sewart, M.A., D.M. (Oxon.), F.F.A.R.C.S., D. Obst. R.C.O.G., Consultant Anaesthetist, High Wycombe Group of Hospitals, Formerly Research Assistant, Nuffield Department of Anaesthetics, University of Oxford, and R. Bryce-Smith, M.A., D.M. (Oxon.), F.F.A.R.C.S., First Assistant, Nuffield Department of Anaesthetics, University of Oxford, Formerly Assistant Professor of Anaesthesia, Western Reserve University, Cleveland, Ohio. Springfield, Illinois: Charles C Thomas, Cloth. 58 pages. 1957. $1.50.

The authors have presented a practical manual with normal midwifery in mind and have laid particular emphasis on self-administered analgesia. The book stresses factors which are essential for good results and will be useful to the physician or anesthetist who are concerned with the practice or teaching of analgesia. Indexed.

Surgery for Nurses. By James Moroney, M.B., Ch.B., F.R.C.S. (Eng.) L.R.C.P. (Lond.); Visiting Consultant Surgeon, Clatterbridge General Hospital, Cheshire, and Broadgreen Hospital, Liverpool. Examiner in Surgery to the General Nursing Council for England and Wales. Formerly Hunterian Professor, Royal College of Surgeons of England. House Surgeon and Surgical Registrar and Tutor, Liverpool Royal Infirmary. Cloth. 712 pages. Edinburgh and London: E. & S. Livingstone, Ltd. and Williams & Wilkins Company, Baltimore. 5th ed., 1958. $7.00.

The fifth edition of this text has been extensively revised. Mr. Moroney has presented the many common complications as well as the more uncommon conditions in a concise manner. Written for nurses, it contains much useful information for anesthetists. The chapter on Pre- and Postoperative Care which includes anesthesia will be of special interest. Indexed.

Aids to Anaesthesia. By Victor Goldman, F.F.A.R.C.S., D.A., L.R.C.P., M.R.C.S.; Senior Lecturer in Anaesthetics, Institute of Dental Surgery, University of London; Consulting Anaesthetist, Queen Mary's Hospital for the East End, Eastman Dental Hospital, and Battersea General Hospital, London. Baltimore, Maryland: Williams & Wilkins Co. Cloth. 359 pages. 4th ed., 1957. Indexed. $3.50.

In the fourth edition of this handbook the subject matter has been brought up to date and a number of illustrations replaced.

The author has presented in a concise manner the essentials that must be known to anyone who administers an anesthetic agent. He has described those methods and apparatus most likely to be met with and gives a brief description of recent developments.

This volume will be a valuable aid to all anesthetists.

Hypnography. A Study in the Therapeutic Use of Hypnotic Painting. By Ainslie Meares, M.B.B.S.B., AGR. Sc. D. P.M., Melbourne, Australia. Springfield, Illinois. Charles C Thomas. Cloth. 271 pages. 1957. $7.75.

Dr. Meares has presented a clinical study in the therapeutic use of hyp-

notic paintings of patients undergoing treatment.

The hypnotized patient projects his conflicts in painting and the material thus obtained is used to help the patient to insight.

This book describes something new in the treatment of nervous illness and will be of interest to the anesthetist who may work with physicians who practice hypnosis. Indexed.

HOW TO WRITE SCIENTIFIC AND TECHNICAL PAPERS. By Sam F. Trelease, Columbia University. Baltimore: Williams & Wilkins Company. Cloth. 185 pages. Indexed. 1958. $3.25.

The statement in the preface of this manual "Few people, in fact, like to write", is the chief reason that this book should be of interest and of value to anesthetists. The author "takes the hand" of the beginner and guides him through the paths of authorship. So carefully is the beginner guided by the author that no person with knowledge to impart should be reluctant to start on the journal. From the choice of material for publication, through the many phases of research, writing, typing, proof-reading and illustration, the details are spelled out clearly and with ample reference suggestions. Dr. Trelease's present book is an outgrowth of two earlier books. In its new form, the book should serve not only as an aid, but also as an inspiration to the novice in the writing field.

VETERINARY ANAESTHESIA. By John G. Wright, Professor of Veterinary Surgery in the University of Liverpool. Baltimore: Williams & Wilkins Company. Cloth. 317 pages, 91 illustrations, indexed. 4th ed., 1957. $6.75.

This book was prepared as a textbook for students. The many advances in anesthesia for humans has stimulated the author to bring the knowledge of veterinary anesthesia up to date. Dealing primarily with anesthesia for domestic animals, a brief chapter is devoted to anesthesia for laboratory animals.

Although most readers of this review are administering anesthesia to humans, there are many who will welcome this text for guidance in their extracurricular activities in laboratory work.

ANESTHESIA AND OTOLARYNGOLOGY. By Donald F. Proctor, M.D.; Assistant Professor of Laryngology and Otology, the Johns Hopkins University School of Medicine; Associate Professor of Laryngology and Otology, Johns Hopkins, 1946-1951; Professor of Anesthesiology, Johns Hopkins, 1951-1955. Baltimore: Williams & Wilkins Company. Cloth. 267 pages, 33 figures. Indexed. 1957. $7.00.

Dr. Proctor has had 15 years' experience as a practicing and teaching otolaryngologist and bronchoesophagologist, and for 4 years practiced anesthesiology in a large medical center. The combination of experiences is presented in this book.

The book is divided into four major divisions: The first section gives general consideration to subjects ranging from mortality and morbidity, cardiac arrest and legal aspects to pulmonary ventilation and premedication. It is in the other three sections that the combined experiences of the author are utilized in presenting the use of general anesthesia, the use of local anesthesia and other aspects of the problem common to the otolaryngologist and anesthesiologist.

The cooperation of the anesthesiologist and the otolaryngologist is stressed throughout the book.

Classified Advertisements

ANESTHETIST-NURSE: 60 bed general hospital, new building, modern equipment, western Wisconsin, college town. Vacation, sick leave, retirement plan. Apply to H. C. Guntner, Manager, Memorial Hospital, Menomonie, Wis.

Registered Nurse Anesthetist in fully accredited 200 bed general hospital with new surgeries. Near Yellowstone Park. Share service equally with four anesthetists — three anesthesiologists on staff. Starting salary $500 per month — regular increments to $575. Vacation, holiday, sick leave, and social security benefits. Thirty physician surgical staff covering all specialties. Apply to Administrator, St. Vincent's Hospital, Billings, Montana.

POSITION WANTED: Male registered nurse anesthetist; army veteran, married. Desires position with hospital on percentage basis, or will free lance. Prefer midwest location but will seriously consider all inquiries. Will graduate from two year accredited school of anesthesia July 31, 1958. Contact R. L. Eighmy, 1925 E. Elm, Springfield, Missouri.

Two openings for anesthetists, created by expansion of hospital. For information write administrator, Baptist Hospital, Pensacola, Florida.

NURSE ANESTHETISTS—$450 per month with experience for a 40-hour week, increments, paid overtime, one month vacation, no nights except for relief, all types of work except Pediatrics—modern air conditioned suites. Apply William E. Montgomery, R.N., Chief Nurse Anesthetist, Akron General Hospital, Akron, Ohio.

WANTED: REGISTERED NURSE ANESTHETIST: 180 bed hospital, modern equipment. Approved by Joint Commission of Accreditation of Hospitals. $500.00 per month salary. May become eligible for retirement benefits. Contact A. M. Tieche, Administrator, Beckley Hospital, Inc., 1007 South Oakwood Ave., Beckley, W. Va.

NURSE ANESTHETISTS — For Homer G. Phillips Hospital, a 1,000 bed hospital under the City of St. Louis. Salary range is $464 to $564 per month. Three weeks vacation. Eleven paid holidays. Sick leave benefits. Write to Department of Personnel, City of St. Louis, 235 Municipal Courts Bldg., St. Louis 3, Mo.

Opening for 2 Registered Nurse Anesthetists. University City. Population 100,000. New 175 bed hospital. 2 M.D. anesthesiologists and 2 R.N.'s now in department. Busy O.B. & Surgery. Day off after call. Must be energetic and willing to adopt new methods. Sick leave. 2 weeks vacation to start. Retirement Plan and other benefits. Congenial working conditions. Begin $450 per month. Contact either Dr. Francis or Miss Chasteen, R.N.A., Central Baptist Hospital, Lexington, Kentucky.

NURSE ANESTHETISTS
Modern, expanding fully accredited Hospital in beautiful Cumberland Valley. College town of 18,000 population, halfway between Philadelphia and Pittsburgh. 40 hour week, 10 days sick leave, 3 weeks vacation, living accommodations at nominal fee if desired. Diversified and congenial surgical staff. 8 bed recovery room. Salary — open. Automatic increments for 3 years, merit increments for next 3 years. Apply: F. J. O'Brien, Administrator, Chambersburg Hospital, Chambersburg, Pa.

REGISTERED NURSE ANESTHETIST: Immediate opening for vacation relief with possibility of permanent employment. 650 bed hospital. Exceptional opportunity for well trained Nurse Anesthetist in active operating room suite. Apply: Personnel Director, Harper Hospital, Detroit 1, Michigan.

NURSE ANESTHETIST, 500 bed hospital. Anesthesia Department consists of one M.D. and thirteen nurses. Positions open for two additional anesthetists. Write to Medical Director, Crawford W. Long Hospital, Atlanta, Georgia.

Registered Nurse Anesthetist: Needed immediately. Modern hospital of 215 beds in Montana's largest city. Great Falls is within easy driving distance of many scenic spots and recreation areas. Salary according to experience and qualifications, paid vacations and cumulative sick leave. Apply to Personnel Director, Columbus Hospital, Great Falls, Montana.

WANTED — relief anesthetist for 4 to 6 weeks beginning July 15 or later. 60 bed general hospital. Call time shared with another anesthetist. $450 a month with full maintenance, or $500 a month without. Call or write Donald Showman, Kennedy Deaconess Hospital, Havre, Montana, Phone 113.

Wanted: Surgical Anesthetist for 150 bed general hospital central Nebraska. Excellent working conditions and personnel policies. $500 per month to $550 per month and full maintenance. Apply: Box M 28, Journal American Association of Nurse Anesthetists, Prudential Plaza, Suite 3010, Chicago 1, Ill.

NURSE ANESTHETIST: For approved 160 bed hospital. 40 hour week, minimum night call, liberal vacation policy and other benefits. Salary open. Anesthesiologist in charge. Apply: Administrator, Milwaukee Children's Hospital, 721 N. 17th St., Milwaukee 3, Wisconsin.

Wanted: Nurse Anesthetist for 1450 bed teaching hospital. Staff of 5 Anesthesiologists, 5 Residents and 5 Nurse Anesthetists. Liberal vacation, holiday and sick leave benefits; only emergency operations on Saturday and Sunday. State age, qualifications and school of anesthesia; also minimum monthly salary expected. Write Mr. George Bondranko, Head Nurse Anesthetist, c/o Personnel Office, Medical College of Virginia Hospital, Richmond, Va.

NURSE ANESTHETIST: Modern, newly constructed, 600 bed county hospital, excellent working conditions, civil service appointments with retirement, sick leave and vacation benefits. Salary $392 with yearly increments to $478. For further information contact John W. Doubenmier, Administrator, Kern County General Hospital, Bakersfield, California.

Anesthetist needed spring 1958. 400 bed modern hospital. Active surgical and obstetrical services. New surgery under construction. Salary dependent on training and experience. Social Security, low cost life insurance. Annual vacation and sick leave after 1 year. Medical anesthesiologist in charge. Contact Director of Anesthesia, Methodist Hospital, Peoria, Ill.

ANESTHETIST: For medium-size hospital. Excellent working conditions. Minimum salary $450 month. Minimum call. Send resume to Personnel Office, Lawrence & Memorial Hospitals, New London, Connecticut.

We are in need of two Nurse Anesthetists AANA Membership to complete our staff of nine. Excellent salary and working conditions. Liberal employment benefits. Five day week, call every 7th night and 7th weekend. 550 bed, general hospital with modern air conditioned Operating Rooms. Apply: Miss Mildred Hodges, Chief Anesthetist, Missouri Baptist Hospital, 919 N. Taylor Ave., St. Louis, Missouri.

NURSE ANESTHETISTS to complete team under two anesthesiologists in center of Boston's cultural and recreational facilities. Good salary without maintenance. Quarters available at minimum cost. Light call duty once weekly and rotation on weekends with extra pay. Write: Anesthesiologist, MASSACHUSETTS EYE AND EAR INFIRMARY, 243 Charles St., Boston 14, Mass.

Wanted Nurse Anesthetist for old established group, attractive salary, paid vacation and sick leave, excellent working conditions. Write The Sugg Clinic, 100-106 E. 13th St., Ada, Oklahoma.

NURSE ANESTHETIST — 125 Bed General Hospital, Southeastern Massachusetts, to work with Anesthesiologist. Salary, etc., open depending on training and experience. Write: William H. Lewis, M.D., 376 Tremont St., Taunton, Mass.

Nurse Anesthetist, 182 Bed General Hospital. Four Anesthetists on staff. Civil Service — Salary $487. Write Superintendent, Puumaile and Hilo Memorial Hospital, Hilo, Hawaii.

Wanted: Two Nurse Anesthetists. Starting salary $425.00 per month. Write Administrator, St. Joseph Mercy Hospital, Ann Arbor, Mich.

Wanted: Experienced Nurse Anesthetist for immediate opening in 100 bed hospital, 10 miles from Philadelphia. Work under Anesthesiologist, no O.B. anesthesia. Write giving age, experience and approximate salary desired. Underwood Hospital, 509 N. Broad St., Woodbury, N. J. Attention Mr. G. B. Torney, Administrator.

Registered Nurse Anesthetist. Excellent working conditions in modern 132-bed hospital. Friendly community with two colleges. Beginning salary $500 plus call pay. Apply Ralph B. Bersell, Administrator, Passavant Memorial Area Hospital, Jacksonville, Ill.

Anesthetist — AANA Member or eligible; two general hospitals — 177 and 130 bed capacity; full accreditation; building expansion in progress; very attractive starting salary with periodic increases — 40 hour week; paid overtime; excellent employee benefits include life insurance, pension plan and social security. Apply: C. J. Nouri, Personnel Director, St. Luke's Hospitals, Milwaukee 15, Wisconsin. Phone: Or 1-2900.

NURSE ANESTHETISTS — for 300 bed hospital increasing to 600 beds. No call. Starting salary $447.72 per month, 2 weeks' vacation, 9 holidays, 10 days sick leave per year. Rotating shifts, no O.B. Apply: Dr. Harold Carron, Head of Anesthesia Department, Tampa General Hospital, Tampa 6, Florida.

NURSE ANESTHETIST: Male or female. Member AANA or eligible. Starting salary $500.00, with increases to $700.00. One month paid vacation, plus sick leave, uniforms furnished and laundry. 225 bed hospital in town of 50,000, 40 miles north of Chicago. New air-conditioned surgery. Emergency call every 5th night. Apply Administrator, Victory Memorial Hospital, Waukegan, Illinois.

Anesthetist, Nurse, excellent working conditions, beginning salary $400.00 with extra pay for call duty; four weeks' vacation annually; sick leave and other employee benefits; department under direction of M.D. anesthesiologist. Apply Personnel Department, Mt. Sinai Hospital, Minneapolis 4, Minnesota.

Nurse Anesthetist—For 209 bed general medical and surgical hospital, resort area, Gulf Coast. Excellent surgical staff. Personnel policies include 30 days annual leave, 15 days sick leave, 8 holidays. Share work with other well qualified nurse anesthetist. Salary range $4025.00 to $6390.00 depending upon qualifications. Non-housekeeping quarters available, other benefits are annual salary increases, life insurance at low rates and an excellent retirement plan. Uniform allowance and free laundry provided. Contact: Director, Professional Services, Biloxi Division, Veterans Administration Center, Biloxi, Mississippi.

NURSE ANESTHETISTS (4)
University hospital — Anesthesiologists and Nurse Anesthetists. Large dept — all types of anesthesia — all benefits. Apply Anesthesiologist in charge,
NEW YORK HOSPITAL — CORNELL UNIVERSITY MEDICAL CENTER,
525 E. 68th St., New York 21, N. Y.

VIRGINIA VACANCY for Anesthetist in the 500 bed teaching hospital of the University of Virginia Medical Center. Pleasant comunity with college social, educational and cultural advantages. Attractive work schedule. Liberal personnel policies. Write: Personnel Director, 1416 W. Main St., Charlottesville, Va.

WANTED. Two nurse anesthetists. 300 bed hospital. $460. per month and full maintenance. Department directed by anesthesiologist. Emergency call alternated every fifth day. Apply St. Francis Hospital, Monroe, La.

NURSE ANESTHETIST: Starting salary for A.A.N.A. member $415 per month with three annual increases of $15 per month to $460 per month after three years. Starting salary if not member of A.A.N.A. $380 per month increased to $415 per month after accepted as member of A.A.N.A. Also included: laundry, private room with bath and telephone in new women's residence or $27 per month allowance if living out; Social Security; pension plan; 40 hour week including full time credit for first call, second call paid for cases done; six paid holidays; 30 days annual vacation; liberal sick leave policy. Apply: Marshall Kerry, M.D., Chief Anesthesiology, The Reading Hospital, Reading, Pa.

REGISTERED NURSE ANESTHETIST to complete staff of three in 100 bed approved Hospital. Starting salary $475.00 per month with meals while on duty; liberal fringe benefits. Contact: John R. Gadd, Administrator, Lee Memorial Hospital, Fort Myers, Fla., the "City of Palms."

Registered Nurse Anesthetist in modern 35 bed hospital. No obstetrical anesthesia. Excellent working conditions, attractive personnel policies. Excellent salary, depending on experience. Apply to Administrator, Memorial Hospital, Pecos, Texas.

Wanted — four nurse anesthetists for enlarged anesthesia department in a 250 bed general hospital located in a resort town eight miles from famous Wrightsville Beach, N. C. At present we have eight full time nurse anesthetists. Write James Walker Memorial Hospital, Wilmington, North Carolina.

NURSE ANESTHETIST, Registered. 200 bed General Hospital, modern living quarters, full maintenance. Princeton Hospital, Princeton, N. J., Therese C. Trupp, Chief Anesthetist.

Nurse Anesthetist, R.N.A. for 215 bed hospital. Excellent surroundings and personnel policies. $6300. starting salary with time and merit increments. Reply J. A. Anderson, Superintendent, Lutheran Hospital, Fort Dodge, Iowa.

WANTED Registered Nurse Anesthetist. Write or call Dr. L. G. Merrill, St. Benedicts Hospital, Ogden, Utah, for details.

NURSE ANESTHETIST — Excellent working conditions, $450.00 per month with annual increases of $25.00 per month. Three weeks vacation after one year, minimum of two weeks sick leave. Usual employee benefits. Lexington is located in "The Heart of the Bluegrass" famous for horse racing and tobacco industries, home of University of Kentucky and Transylvania College. Apply, Assistant Administrator, Good Samaritan Hospital, South Limestone St., Lexington, Ky.

Position open for A.A.N.A member, present staff of three. Large University Hospital, excellent staff, with wide variety of surgical cases, including thoracic and cardiac surgery. Two weeks paid vacation, twelve days sick leave, six paid holidays and insurance benefits if desired. Salary dependent upon experience, plus compensation for call time. Contact Miss Ramona Kersey, Chief Nurse Anesthetist, Firmin Desloge Hospital, St. Louis, Mo.

Wanted: Nurse Anesthetist June 1 for 100 bed hospital. No Neuro or Chest surgery. Liberal personnel policies. Call every third day and week end. Following day off after call. Write Miriam P. Savage, St. Mary's Hospital, Green Bay. Wisc.

The 28th Qualifying Examination will be held on November 8. The deadline for accepting completed applications and transcripts is October 1.

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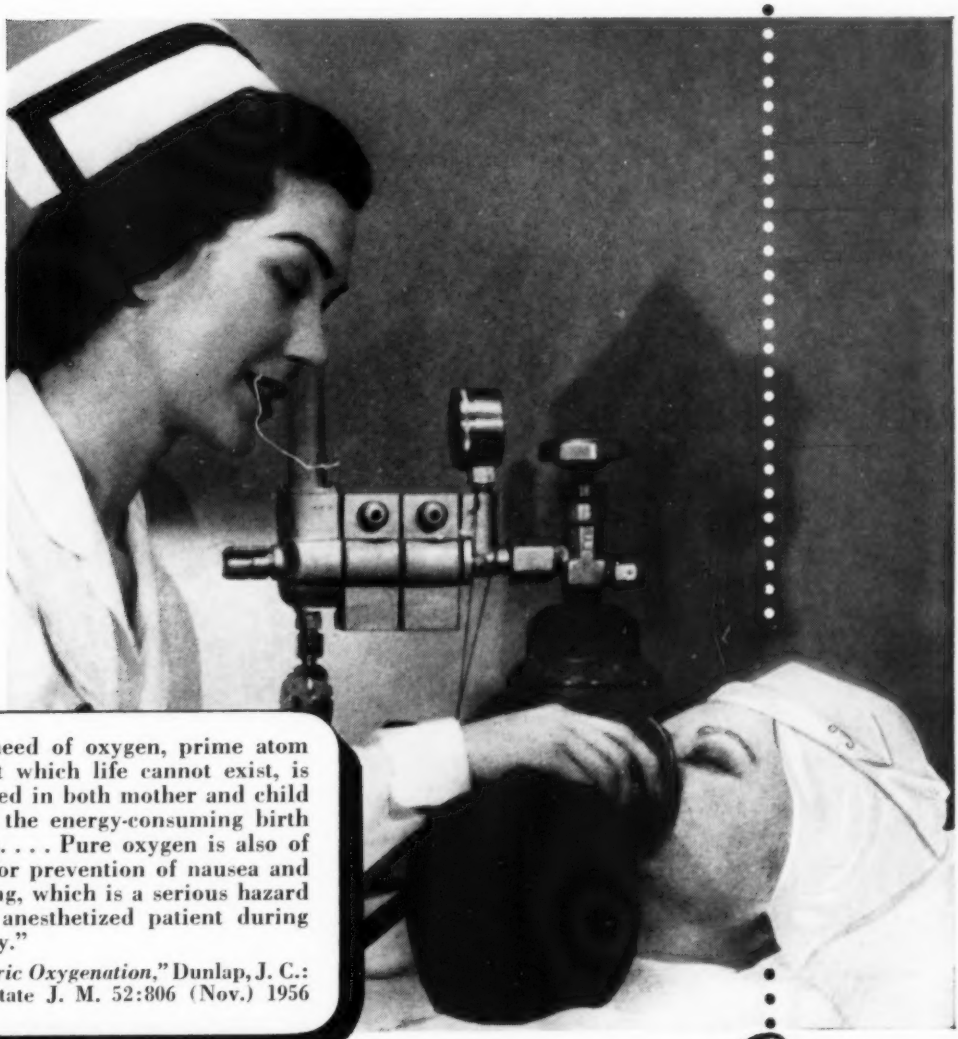

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"*Obstetric Oxygenation*," Dunlap, J. C.: Texas State J. M. 52:806 (Nov.) 1956

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